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ENGINEERING-SCIENCE INC ATLANTA GA
INSTALLATION RESTORATION PROGRAM. PHASE I. RECORDS SEARCH. HAZA--ETC(U)
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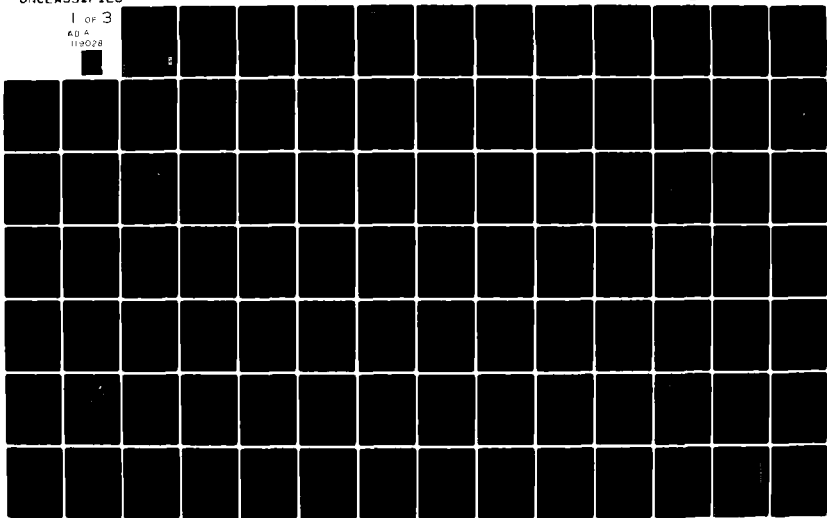
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INSTALLATION RESTORATION PROGRAM

PHASE I - RECORDS SEARCH,
HAZARDOUS MATERIALS DISPOSAL SITES

MYRTLE BEACH AFB,
SOUTH CAROLINA

AD A119028

PREPARED FOR

UNITED STATES AIR FORCE
AFESC/DEV

Tyndall AFB, Florida

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**INSTALLATION RESTORATION PROGRAM,
PHASE I: MYRTLE BEACH AFB**

**Prepared for
United States Air Force
AFESC/DEV
Tyndall AFB, Florida**

October, 1981

F08637-80-G-0009

**By
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October 9, 1981

Mr. Myron Anderson
AFESC/DEVP
Tyndall AFB, Florida 32403

Dear Mr. Anderson:

Enclosed is the Engineering-Science, Inc. (ES) FINAL report entitled "Installation Restoration Program, Phase I Records Search, Hazardous Materials Disposal Sites, Myrtle Beach AFB, South Carolina." This report has been prepared in accordance with the ES' proposal dated May 15, 1981 and Air Force Contract number F08637-80-G-0009 Call #005.

Presented in this report are introductory background information on the Installation Restoration Program, a description of the Myrtle Beach AFB installation including past activities, mission and environmental setting, a review of industrial activities at Myrtle Beach AFB, an inventory of major solid and hazardous waste from past activities, a review of past and present waste handling, treatment and disposal facilities, and an evaluation of the pollution potential of each identified site.

We appreciate the opportunity to work with you and the other Air Force personnel who contributed information to us for the completion of this assessment.

Very truly yours,

ENGINEERING-SCIENCE, INC.

C. Mangan
C. M. Mangan, P.E.
Senior Project Manager

CMM:bm

Enclosure

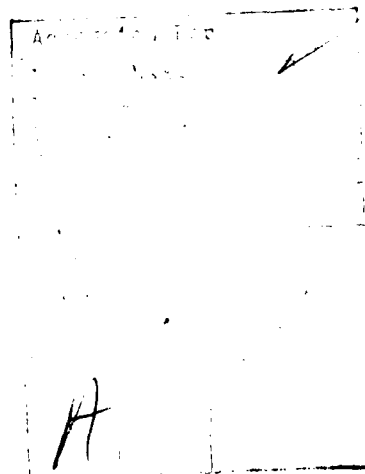


TABLE OF CONTENTS

		<u>Page</u>
List of Figures		v
List of Tables		vi
Executive Summary		-1-
CHAPTER 1	INTRODUCTION	1-1
	Background	1-1
	Authority	1-1
	Purpose and Scope of Assessment	1-2
	Phase I Project Description	1-2
CHAPTER 2	INSTALLATION DESCRIPTION	2-1
	Location, Size and Boundaries	2-1
	History of Myrtle Beach Air Force Base	2-4
	Current Organization and Mission	2-8
	Detachment 11, 39th Air Rescue and Recovery Squadron	2-9
	Det 3, 3rd Weather Squadron	2-9
	301st Field Training Detachment	2-9
	Det 12, 400th Management Engineering Squadron	2-9
	73rd Tactical Control Flight	2-9
	2066th Communications Squadron	2-10
	Det QD2P Headquarters USAF, USAF Judicial	
	Area Defense Council	2-10
	Det 2105 Air Force Office of Special Investigation	2-10
	AFCOM (Commissary)	2-10
	Miscellaneous Tenants	2-10
CHAPTER 3	ENVIRONMENTAL SETTING	3-1
	Meteorology	3-1
	Geography	3-1
	Topography	3-1
	Drainage	3-1

	<u>Page</u>
Surface Geology	3-3
Barrier Sediments	3-3
Myrtle Beach Backbarrier Sediments	3-3
Soils	3-5
Subsurface Geology	3-6
Hydrology	3-10
Ground Water	3-10
Hydrogeologic Units	3-10
Surface Water	3-14
Water Quality Monitoring	3-15
Ground Water	3-15
Surface Water	3-15
Environmentally Sensitive Conditions	3-17
Ground Water	3-17
Threatened and Endangered Species	3-18
Surface Water	3-18
 CHAPTER 4	
FINDINGS	4-1
Past Activity Review	4-1
Waste Generated by Activity	4-1
Pesticide and Herbicide Utilization	4-9
Hazardous Waste Storage	4-13
Fuels Management	4-13
Description of Disposal Methods	4-16
Waste Management Facilities	4-16
Off-Site Disposal Facilities	4-31
Evaluation of Past Waste Disposal Facilities	4-32
 CHAPTER 5	
CONCLUSIONS	5-1
 CHAPTER 6	
RECOMMENDATIONS	6-1
Recommendations for Phase II	6-1
First Priority	6-1
Second Priority	6-2
Other Recommendations	6-2
 APPENDIX A	
PHOTOGRAPHS	
 APPENDIX B	
ANNEX DESCRIPTION	
 APPENDIX C	
MISCELLANEOUS DATA	
 APPENDIX D	
STATE WATER RESOURCES COMMISSION CORRESPONDENCE	

APPENDIX E	STATE STANDARDS
APPENDIX F	FACILITY DESCRIPTIONS
APPENDIX G	DEFENCE ENVIRONMENTAL QUALITY PROGRAM POLICY MEMORANDUM
APPENDIX H	HAZARD EVALUATION METHODOLOGY
APPENDIX I	INDIVIDUAL WASTE RATING FORMS
APPENDIX J	REFERENCES
APPENDIX K	GLOSSARY

APPENDIX L

LIST OF FIGURES

		<u>Page</u>
2.1	Myrtle Beach AFB Regional Location	2-2
2.2	Myrtle Beach AFB Local Area	2-3
2.3	Myrtle Beach AFB Site Layout, 1955	2-6
2.4	Myrtle Beach AFB Site Layout, 1981	2-7
3.1	Myrtle Beach AFB Surface Drainage and Surface Water Sampling Points	3-2
3.2	Myrtle Beach AFB Surface Soils	3-4
3.3	Myrtle Beach AFB Location of Geologic Cross Sections	3-7
3.4	Myrtle Beach AFB Structural Cross- Section, A-A', Horry County	3-8
3.5	Myrtle Beach AFB Structural Cross- Section, B-B', Horry County	3-9
3.6	Myrtle Beach AFB Recharge and Outcrop Areas	3-11
4.1	Myrtle Beach AFB Decision Tree	4-2
4.2	Myrtle Beach AFB Radioactive Vault	4-10
4.3	Myrtle Beach AFB Fire Training Areas	4-12
4.4	Myrtle Beach AFB Major Fuel Storage Areas	4-17
4.5	Myrtle Beach AFB Location of Landfills and Weathering Pits	4-18
4.6	Myrtle Beach AFB Landfill No. 1 1955-1960	4-21
4.7	Myrtle Beach AFB Landfill No. 2 1960-1964	4-22
4.8	Myrtle Beach AFB Landfill No. 3 1964-1968	4-23
4.9	Myrtle Beach AFB Landfill No. 4 1968-1972	4-25
4.10	Myrtle Beach AFB Landfill No. 5 1972-1974	4-27
4.11	Myrtle Beach AFB Drainage Areas	4-28

LIST OF TABLES

		<u>Page</u>
3.1	Stratigraphic Units of the South Carolina Coastal Plain of Horry Count'y	3-6
3.2	Hydrogeologic Units	3-13
4.1	Industrial Operations Utilizing Toxic/ Hazardous Materials	4-4
4.2	Industrial Operations (Shops)	4-5
4.3	Landfill Information Summary	4-19
4.4	Priority Ranking of Potential Contamination Sources, Myrtle Beach AFB	4-33
5.1	Summary Ranking of Potential Contamination Sources	5-2

EXECUTIVE SUMMARY

The Resource Conservation and Recovery Act of 1976 (RCRA) was promulgated to regulate the generation, transportation, storage, treatment and disposal of hazardous wastes. Simultaneous to the passage of RCRA, the Department of Defense (DOD) devised a Comprehensive Installation Restoration Program (IRP) to identify, report and correct potential environmental deficiencies that could result in ground-water contamination and probable migration of contaminants beyond DOD installation boundaries. The IRP has been developed as a three phase program

- Phase I - Problem Identification/Records Search
- Phase II - Problem Confirmation and Quantification
- Phase III - Corrective Action,

Engineering-Science (ES) was contracted to conduct Phase I of the IRP for Myrtle Beach Air Force Base (AFB).

The on-site portion of Phase I was performed at Myrtle Beach AFB June 29 through July 2, 1981. During this period formal interviews were conducted with key base personnel familiar with past waste disposal practices, and file searches were performed for identified facilities which have generated, handled, transported, and disposed of waste materials.

INSTALLATION DESCRIPTION

Myrtle Beach Air Force Base is located in northeastern South Carolina approximately 1/2 mile from the City of Myrtle Beach. The base covers 3793 acres and is situated on the Grand Strand, a strip of land bounded on the southeast by the Atlantic Ocean and the northwest by the Intracoastal Waterway. Besides the main base, there is an off base radar station - Fort Fisher AFS which is 90 miles north of Myrtle Beach. The annex is located on 25 acres.

ENVIRONMENTAL SETTING

As a result of our on-site visit, the following conclusions have been reached with regard to the environmental sensitivity of Myrtle

Beach AFB. There are no wetlands nor any known threatened or endangered plant species on the base property. Other conclusions are:

1. The base has a low fluoride well which is in the water table aquifer and which is available to individuals willing to fill a container at the well. Myrtle Beach AFB is constructed in the recharge zone for the water table aquifer. The ground water table varies from six inches to five feet below the ground surface.
2. Major potable water aquifers at the base are up to 800 feet deep. Given the local geology, it is unlikely that leachate or hazardous waste discharges would migrate to these aquifers.
3. Municipal wells adjacent to the base's boundary are deep wells and probably should not be affected by base activities.
4. The base's habitat is a conducive environment for the red-cockaded woodpecker and alligator. However, there are no known nesting areas on the base.

PROCEDURES

A review of all waste generation sources at the base was conducted to determine past disposal methods for hazardous wastes. This review included industrial shop areas, pesticide and herbicide utilization, low level radioactive waste sources, fire control training area, hazardous waste storage areas and POL (Fuels Management) areas. Past and present waste materials were identified and the disposal methods used for each source were determined according to base records or interviews. The waste management facilities included on-site landfills (five sites), oil-water separators, sanitary sewer, storm sewer, septic tanks, off-site hazardous waste contract disposal, and off-site non-hazardous waste contract disposal.

Fifteen disposal sites located on the Myrtle Beach AFB property were identified as containing hazardous material resulting from past waste disposal activities. These sites have been assessed using a rating system which takes into account factors such as site

characteristics, waste characteristics, potential for contamination and waste management practices. The details of the rating procedure are presented in Appendix H and the results of the assessment are given in Table 1. Rating scores were developed for the individual sites and the sites are listed in order of ranking. The rating system is designed to indicate the relative need for more detailed site assessment and/or remedial action.

FINDINGS AND CONCLUSIONS

Based on the results of the project team's one-week field inspection, review of records and files, and interviews with base personnel, the following conclusions have been developed. The conclusions are listed by category.

1. Weathering Pits

- a.) Weathering Pits are constructed to hold spent fuel filters while the fuel evaporates. Weathering Pit No. 2 has the greatest potential for off-site migration of contaminants and has received a score of 82. Unauthorized dumping of oils, solvents and paint strippers has created a potential contamination problem. This situation is compounded by the site's sandy soil and shallow ground water table.
- b.) Weathering Pit No. 1 received a lower score (68) than Weathering Pit No. 2 because it was closed and no visual contamination was apparent.

2. Spill Areas

- a.) The JP-4 spill area adjacent to the Myrtle Beach Pipeline bulk storage tank received a score of 78. To date 24,000 of the 124,000 gallons of fuel have been recovered.
- b.) Two other spill areas which were ranked with a lower score were the POL spill area (Score 73) and the Flight Line contaminated area which is adjacent to Building 358 (Score 73). Although the POL fuel spill occurred over 15 years ago, there may be residual fuel contamination on the base. This was reinforced when the State's pump test adjacent to Building 358 found fuel in the ground water during a 24 hour pump test.

TABLE 1
SUMMARY RANKING OF POTENTIAL
CONTAMINATION SOURCES

Rank	Site Name	Period of Operation	Score
1	Weathering Pit #2	1979-1981	82
2	Myrtle Beach Pipeline Corp.*	1981	78
3	POL Bulk Fuel Storage Area*	1963-1967	73
4	Flight line Conta- minated Area*	1977	73
5	Landfill #3		68
6	Fire Training Areas #1 & #2	1955-1964	68
7	Weathering Pit #1	1973-1978	68
8	Fire Training Area #3	1965-1969	64
9	Landfill #4	1968-1972	60
10	Underground Waste Chemical Storage	1978-present	54
11	Landfill #1	1955-1960	53
12	Landfill #2	1960-1964	51
13	Landfill #5	1973-1974	51
14	Radioactive Vault	1959	35
15	Fire Training Area #4	1970-1981	33

* Spill or date of observation

3. Landfills

- a.) Landfills No. 3 and 4 both received small quantities of hazardous waste, were operated as trench and cover operations, and are located in similar geologic formations. Landfill No. 3 (Score 68) ranks higher than Landfill No. 4 (Score 60) because leachate has been observed during wet weather conditions.
- b.) Landfill No. 1 and No. 2 were operated as burn and cover operations so that most flammable chemicals would have been destroyed.

4. Fire Training Areas

- a.) Fire Training Areas No. 1 and No. 2 ranked high (Score 68) because of the large amount of waste chemicals added to the sandy soil before it would become saturated and support combustion.
- b.) Fire Training Area No. 3 has been reforested with southern pine and no visual evidence of contamination exists. The establishment of trees indicates that residual chemicals have not prevented root growth. The sandy soil would be conducive to flushing of chemicals into the ground water leaving minimal residual in the soil.

RECOMMENDATIONS

The following recommendations are made to further assess the potential for contaminant migration from waste disposal sites at Myrtle Beach AFB. The recommendations are grouped into three areas: first, second and third priority. Sites with overall scores of 65 to 100 are in the First Priority category and are sites of primary concern, based on their potential for waste migration off-site. They require further investigation in Phase II. Sites of secondary concern fall into Second Priority, with scores from 60 to 65. Further investigation for these sites is recommended. Third Priority sites (scores from 0 to 59) are other sites with a low potential for contamination and no further monitoring is recommended unless data collected from other higher priority sites indicates a problem.

RECOMMENDATIONS FOR PHASE II

First Priority

- 1.) Ground water contamination by petroleum products has been documented at three (3) separate locations on Myrtle Beach Air Force Base. They are: the Myrtle Beach Pipeline Bulk Storage spill area, POL spill area and the Flight line contamination area. In order to make a preliminary determination of the severity and extent of contamination, it is recommended that surface geophysical methods (electromagnetic conductivity, ground penetrating radar or electrical resistivity) be employed to map subsurface zones degraded by POL contamination.
- 2.) It is recommended that a ground water monitoring program be established at each site to determine whether there is any contamination from Weathering Pit No. 1 and No. 2, the Fire Training Areas No. 1 and No. 2, and Landfill No. 3. Such a system should consist of at least one monitoring well located hydraulically up-gradient of the site, and three monitoring wells located hydraulically down-gradient of the site. At a minimum, the following parameters should be monitored: nitrate, chloride, iron, maganese, phenol, sodium, sulfate, pH, specific conductance, total organic halogen and total organic carbon. A grab sample of leachate should also be collected adjacent to Landfill No. 3 to characterize leachate generated during the wet season.

Second Priority

It is recommended that ground water and surface water sampling be performed for Fire Training Area No. 3 and Landfill No. 4, with similar analyses being carried out as recommended above. The second priority sites should not be undertaken unless the analytical data from similar first priority sites indicate a contamination problem.

Other Recommendations

Obtain a water sample from the low fluoride well and run an organic pollutant scan on the GC/MS. Organic parameters from EPA's priority pollutant list should be measured.

CHAPTER 1
INTRODUCTION

CHAPTER 1

INTRODUCTION

BACKGROUND

The discharge, disposal, or storage of solid wastes into or on the land surface is controlled by both state and federal laws. The key legislation governing the management and disposal of solid waste is the Resource Conservation and Recovery Act of 1976 (RCRA). The Act was promulgated to regulate the generation, transportation, storage, treatment and disposal of hazardous wastes; regulate facilities for the disposal of all solid wastes; phase out the use of open dumps for disposal of solid wastes; and to promote the conservation of natural resources through the management, reuse or recovery of solid and hazardous waste. Regulations and implementation instructions of RCRA are continuing to be developed by the U.S. Environmental Protection Agency (EPA).

Under RCRA Section 3012 (PL 96-482, October 21, 1980), each state is required to inventory all past and present hazardous waste disposal sites. Under Section 6003 of RCRA, Federal agencies are required to assist EPA and make available all requested information on past disposal practices. It is the intent of the Department of Defense (DOD) to comply fully with these as well as other requirements of RCRA.

AUTHORITY

Simultaneous with the passage of RCRA, the DOD devised a comprehensive Installation Restoration Program (IRP). The purpose of the IRP is to identify, report and correct potential environmental deficiencies that could result in ground water contamination and probable migration of contaminants beyond the DOD installation boundaries. In response to RCRA and in anticipation of the Comprehensive Environmental Response Compensation and Liability Act of 1980 (Superfund), the DOD issued the directive DEPQPPM 80-6 requiring identification and quantification of

hazardous waste disposal sites on DOD agency reservations, and thereafter the implementation of remedial actions for any potential migration of hazardous contaminants from the installation.

PURPOSE AND SCOPE OF THE ASSESSMENT

The Installation Restoration Program has been developed as a three-phased program as follows:

- Phase I - Problem Identification/Records Search
- Phase II - Problem Confirmation and Quantification
- Phase III - Corrective Action

The Problem Identification/Records Search phase (Phase I) is directed towards providing answers to the following questions:

1. What hazardous materials have been generated on the reservation?
2. How have the wastes been managed?
3. Was the waste management procedure adequate to immobilize, contain, treat, destroy or detoxify the waste material?
4. By what routes or means (if any) can the wastes migrate off the reservation?
5. What effects could occur (or might have occurred) through the discharge or release of the wastes?

The purpose of this report is to summarize and evaluate the information collected during Phase I of the IRP.

Phase I Project Description

The goal of the first phase of the program was to identify the potential for environmental contamination from past waste disposal practices at Myrtle Beach AFB, and to assess the probability of contaminant migration beyond the installation boundary. The activities undertaken by Engineering-Science (ES) in Phase I included the following:

- Review site records
- Interview key personnel familiar with past generation and disposal
- Inventory wastes
- Determine quantities and locations of current and past hazardous waste storage, treatment and disposal

- Evaluate disposal practices and methods
- Determine adequacy of storage, treatment and disposal facilities
- Gather pertinent information from federal, state and local agencies
- Evaluate compliance with federal, state and local regulations
- Assess potential for contamination
- Preliminary evaluation of extent of potential contamination
- Determine potential for materials to migrate off site
- Conduct field inspection
- Determine the need for emergency response

In order to perform the on-site portion of the records search phase, ES assembled the following core team of professionals:

- C.M. Mangan, Environmental Engineer and Project Manager
- J.R. Absalon, Hydrogeologist
- D.L. Gregory, Environmental Engineer
- M.I. Spiegel, Environmental Scientist
- R. M. Reynolds, Chemical Engineer

The on-site portion of the Records Search phase was performed at Myrtle Beach AFB June 29 through July 2, 1981. During this period formal interviews were conducted with key base personnel. File searches were conducted within on-site organizations which generate, handle, transport, and dispose of waste materials. A site visit was also conducted at Fort Fisher AFS, an off base TAC radar station. Field reconnaissance was conducted at all identified facilities that treated, stored or disposed of hazardous materials. These facilities include landfills, waste treatment facilities, material storage areas, weathering pits, industrial shops and other support facilities. In addition, visits were made to the following agency offices in Myrtle Beach and Columbia including:

- o U.S. Geological Survey-Water Resources Division
- o Grand Strand Water and Sewer Authority
- o S.C. Division of Geology
- o Coastal Carolina Regional College
- o S.C. Land Resources Commission
- o S.C. Water Resources Commission

o S.C. Department of Health and Environmental Control

- Surface Water Quality Monitoring
- Ground Water Protection
- Industrial-Agricultural Wastewater
- Solid Waste Management

The information collected during this intensive record search is summarized and evaluated in subsequent chapters.

CHAPTER 2
INSTALLATION DESCRIPTION

CHAPTER 2
INSTALLATION DESCRIPTION

LOCATION, SIZE AND BOUNDARIES

Myrtle Beach Air Force Base (MBAFB) is located in northeastern South Carolina, as shown in Figure 2.1., approximately 85 miles north of Charleston and 60 miles south of Wilmington, North Carolina. Myrtle Beach Air Force Base is located in Horry County (1152 square miles) which is the largest county in the state and is situated adjacent to the Atlantic Ocean and neighboring state of North Carolina (See Figure 2.2). The city of Conway is the county seat and is located 15 miles northwest of Myrtle Beach Air Force Base. The city of Myrtle Beach adjoins the base to the northeast. The general area surrounding the base is distinguished geographically by a sixty mile strip of land extending northeast from Winyah Bay at Georgetown to the North Carolina border (See Figure 2.2). This strip of land labeled the Grand Strand is bounded on the southeast by the Atlantic Ocean and on the northwest by the Intracoastal Waterway. The city of Myrtle Beach is primarily a recreational community with a wintertime population of 20,000 and a summertime peak population of 250,000.

The Myrtle Beach AFB covers 3793 acres which are divided as follows:

<u>Area Description</u>	<u>Acreage</u>
Improved	1038
Semi-improved (vegetation kept 3 to 8 inches in height)	1090
Unimproved	1150
Under Facilities	515

The pattern of land use within the base's region of influence can be divided into two distinct types, 1. development determined by shore and river location and 2. inland development.

In the first category of land use, that determined by shore and river locations, the established pattern along the coast is resort-residential and commercial land use. Overall development

FIGURE 2.1

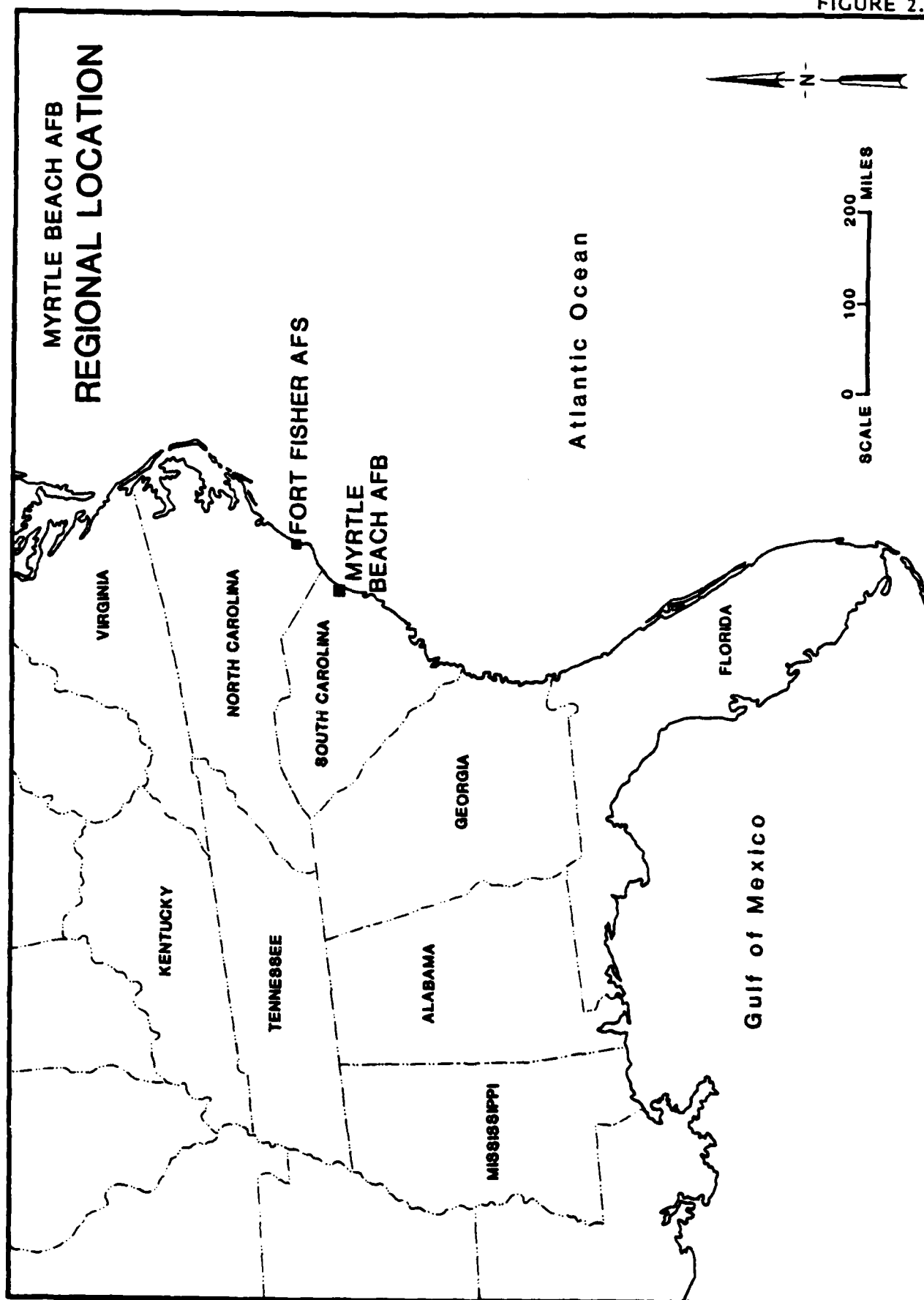
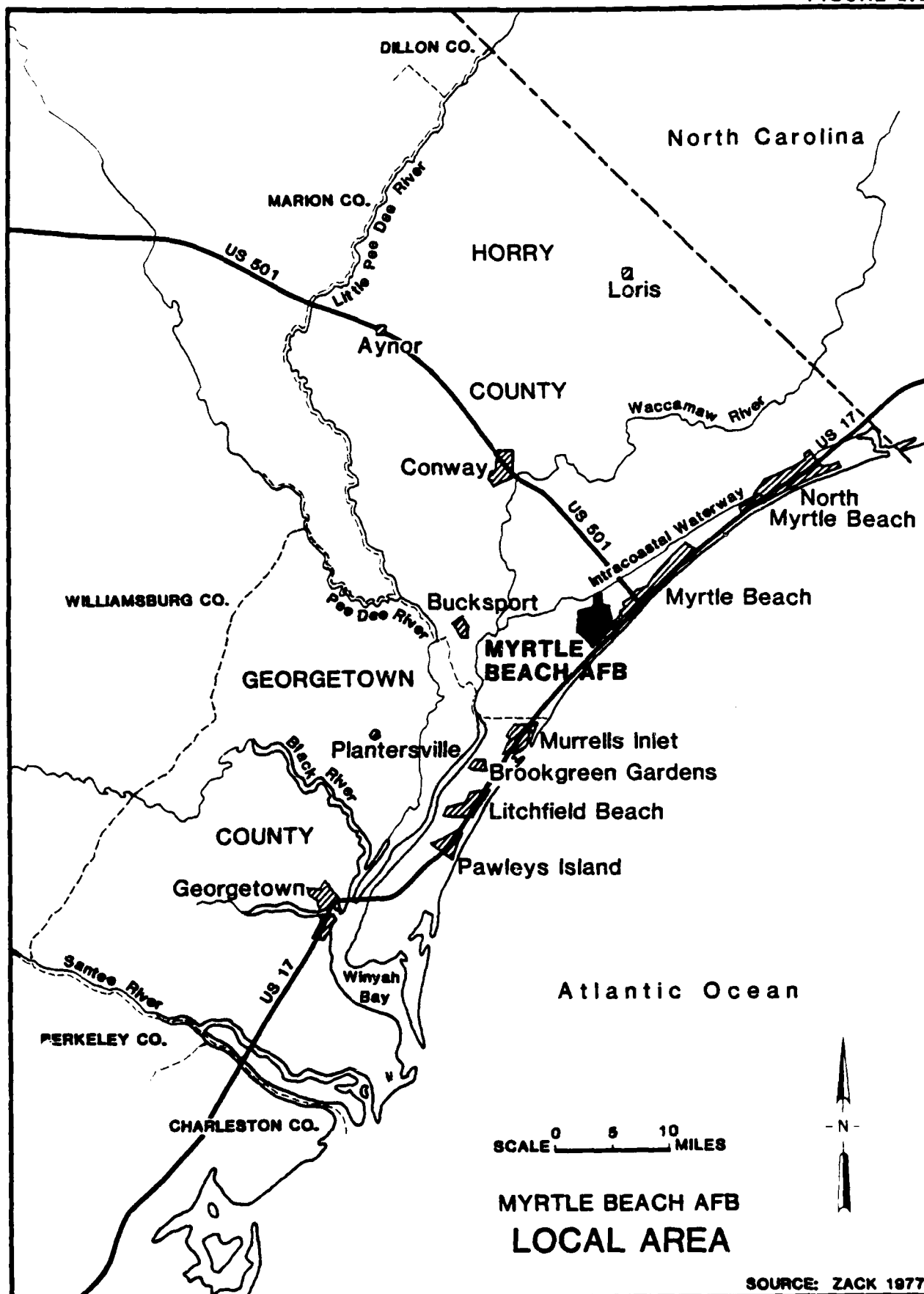


FIGURE 2.2



SOURCE: ZACK 1977

in the past has been predominantly low to medium density transient and seasonal housing; the declining availability of prime land and changing economic conditions are influencing a trend toward more concentrated private and commercial residential development. Commercial activities have developed in a random pattern along the frontage of Highway 17, a major road which provides access to other shore locations.

Northeast and northwest of the base there are scattered pockets of residential development including single family homes and trailer parks. Generally the western and southwestern borders of the base are timberland and undeveloped properties.

Beside the main base, there is an off base TAC radar station located at Fort Fisher AFS. Fort Fisher AFS is shown on Figure 2.1 approximately 90 miles north of MBAFB and comprises 25 acres with another 212 acres which have been leased from the U.S. Army as a radar clearance zone.

HISTORY OF MYRTLE BEACH AIR FORCE BASE

Prior to 1940, a municipal airport was operated at MBAFB. In 1940, preparations were made to improve the Myrtle Beach Municipal Airport so that it might be incorporated into the national defense program. The area was first used by the Army Air Corps in June 1940 when the Third Observation Squadron arrived at the municipal airport to conduct firing practice along the ocean front and to map and photograph the entire area.

In March 1942, men arrived from the Savannah Army Air base to establish and operate a bombing and gunnery range detachment. Throughout World War II, numerous units were trained on the range as a prerequisite for going overseas. The training program consisted of several phases; bombardiers practiced bombing and gunners were given schooling in fixed and flexible gunnery. The range at Myrtle Beach was composed of some 100,000 acres in nine tracts, three of which were owned and six were leased by the government. The government tracts containing an aggregate of 97,300 acres were known as the Myrtle Beach, Conway and Georgetown areas. The Myrtle Beach tract, located in Horry County was located between the Atlantic Intracoastal Waterway and Conway. The Georgetown area contained a demolition range and two bombing ranges, while the

Conway area had one demolition range, three bombing ranges and a machine gun and rifle range.

At the end of World War II, over 114 buildings had been built and the entire base was connected by a network of access and secondary roads. As shown on Figure 2.3, all of the taxiways were laid out in a dispersal pattern so as to minimize any direct hits on aircraft which were parked (See aerial photograph in Appendix A, page A-1). Fueling areas were also dispersed as is indicated on Figure 2.3.

During the winter of 1945 to 1946, the mission of Myrtle Beach became one of recruitment and support of special activities. The Civil Air Patrol, the National Guard and the United States Military Academy were among the organizations that utilized the field for encampments and various other activities that were supported by the base. November 1, 1947 was the date the base was inactivated and at that time the runways and tower were turned over to the City of Myrtle Beach for use as a municipal airport.

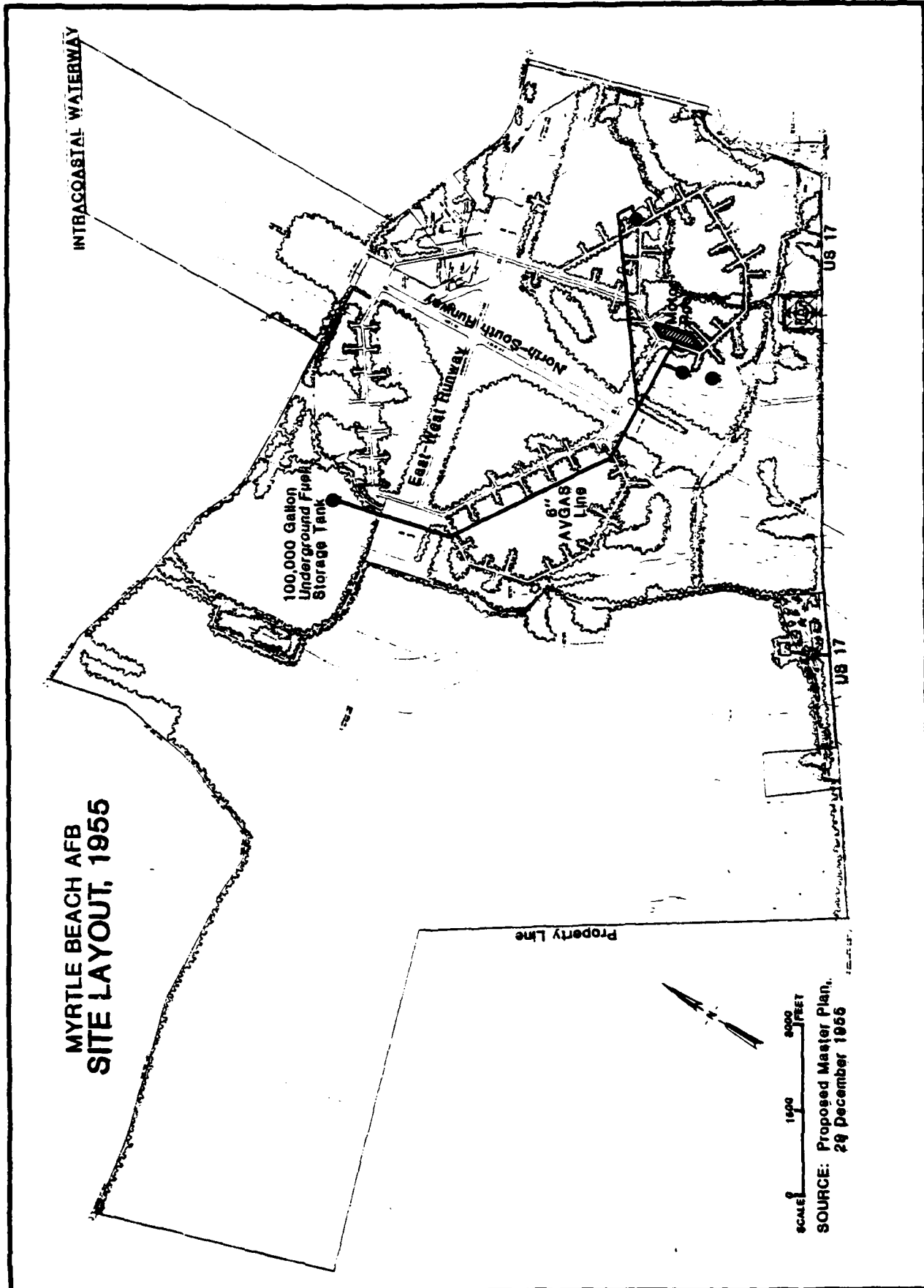
During the period from 1947 until 1954, the city pursued the reactivation of the base with both the U.S. Army and Air Force. During that period the city operated a municipal airport and leased a small portion of the property adjacent to terminal to Aerovox Corporation, a manufacturer of ceramic capacitors.

During this period, the city restricted access and scavenging at the site. Other commercial concerns which rented property at that time were:

- o Boston Braves training camp located at the south end of the runway
- o Turkey Farm
- o Piedmont Airlines
- o Hotdog Cooker Company
- o Automobile race track utilizing the old motor pool area and southeast loop of revetment.

In June 1954, the Air Force accepted the City's donation of the airport. At that time, the base encompassed over 4,400 acres. Figure 2.4 shows the current base layout. Most of the World War II buildings were demolished with the new cantonment area and flight line

FIGURE 2.3



A horizontal scale bar with a vertical line at the left end labeled '0' and a vertical line at the right end labeled '2400'. Below the bar, the word 'SCALE' is written on the left and 'FEET' is written on the right.



constructed on the western portion of the base property. An aerial photograph from 1978 is presented in Appendix A (page A-2).

In 1955 before the base was fully operational, the Seven Twenty Seventh Aircraft Control and Warning Squadron arrived at Myrtle Beach to become the installation's first tenant unit. Shortly thereafter, the 4434th Air Base Squadron was established as the housekeeping unit. This unit was subsequently replaced by the 354th Fighter Day Wing which was in 1958 redesignated the 354th Tactical Fighter Wing.

A brief history of Fort Fisher AFS is presented in Appendix B.

CURRENT ORGANIZATION AND MISSION

The 354th Tactical Fighter Wing is the host unit at the Myrtle Beach AFB under the direction of the Tactical Air Command (TAC). The wing's mission is to maintain the capacity to execute, and execute when directed, tactical fighter missions designed to destroy enemy military air/ground forces, supplies, equipment, communication systems, and installations with conventional weapons. To maintain this capacity, the operational squadrons continue flight proficiency missions.

The 354th Tactical Fighter Wing is composed of three operational squadrons, five maintenance and support squadrons, and the 354th Combat Support Group. Maintenance and support units directly supporting the wing include the supply squadron, transportation squadron, aircraft generation squadron, component repair squadron, and equipment maintenance squadron. The 354th Combat Support Group provides base support for the tactical fighter wing.

Complete medical services at Myrtle Beach AFB are supplied by the 20-bed USAF Hospital.

Because of its host position, the 354th Tactical Fighter Wing is responsible for support of Myrtle Beach's various tenant units. This responsibility includes law enforcement health care, administration, civil engineering, commissary, exchange and other services and facilities. The mission/functions of the major tenant organizations are summarized in the following paragraphs.

Detachment 11, 39th Air Rescue and Recovery Squadron

This detachment provides airborne rescue and recovery capability to the host wing. The unit presently is assigned three UH-1N helicopters to provide capability to recover aircrews from land or coastal waters.

Det 3, 3rd Weather Squadron

The mission is to provide or arrange for aerospace, environmental staff, and operational support services required by the 354 TFW and other US government agencies and activities at Myrtle Beach AFB. The unit is equipped with sophisticated weather radar and close circuit television for briefings within the Wing.

301st Field Training Detachment

The mission is to provide system and associate maintenance courses for the 354 TFW. The detachment trains the entire Tactical Fighter Wing to provide personnel with required skills to perform aircraft maintenance. The detachment has 17 classrooms and is staffed with 23 instructors from Air Training Command.

Det 12, 400th Management Engineering Squadron

The mission is to provide the capability for improved management of USAF/TAC resources through the development and maintenance of manpower standards and management improvement studies, and by rendering assistance to TAC commanders in the areas of manpower and organization, in-service contracts, and management engineering consultant services. The unit is authorized 6 personnel for duties which include processing manpower change proposals, accomplishing civilian reviews, and providing current Manpower Source Listings.

73rd Tactical Control Flight

The mission is to maintain the capability for rapid mobilization to support combat operations with radar control and warning. The 48 man unit is equipped with lightweight surveillance and control ground based radar, point-to-point and air-to-ground communications, and a small operations facility.

2066th Communications Squadron

The mission is to provide base and long haul communications, navigation aids, and air traffic control services to Myrtle Beach AFB, the US Air Force, and other agencies. The unit assists the civilian aviation community by directing arrivals and departures of aircraft for the area airports including North Myrtle Beach, Conway, and Georgetown.

Det QD2P Headquarters USAF, USAF Judicial Area Defense Council

The mission is to improve credibility of the military justice system by removing any appearance that the military defense counsel are constrained professionally because they are assigned to the command of the convening authority. Two personnel are assigned to this detachment.

Det 2105 Air Force Office of Special Investigation

The mission is to provide specialized criminal, counter-intelligence, and fraud investigation service to the Commander, 354 Combat Support Group.

AFCOM (Commissary)

The mission is to assure responsibility for requesting receiving, storing, issuing, and selling of authorized subsistence items at this installation.

CHAPTER 3
ENVIRONMENTAL SETTING

CHAPTER 3

ENVIRONMENTAL SETTING

The environmental setting of Myrtle Beach Air Force Base is described in this chapter with the primary emphasis directed toward identifying features that could transport hazardous waste contaminants off base. Environmentally sensitive conditions are highlighted in the final section of this chapter.

METEOROLOGY

Temperature, precipitation and other relevant climatic data furnished by Detachment 3, 3rd Weather Wing, are presented as Table C.1. The indicated period of record is 37 years (1942-1947 and 1949-1981). Mean annual precipitation is given as 49.8 inches.

GEOGRAPHY

Myrtle Beach Air Force Base is located within the Sea Island subdivision of the Atlantic Coastal Plain physiographic region (Fenneman, 1938 and Colquhoun, 1969). Landforms of this zone include plains and hills. The hills include sand dunes and wave-cut scarp and ridges lying along the oceans. The plains lie inland of the hills and are typically flat. These features are normally found in systems extending parallel to a seaward scarp and generally parallel to the ocean.

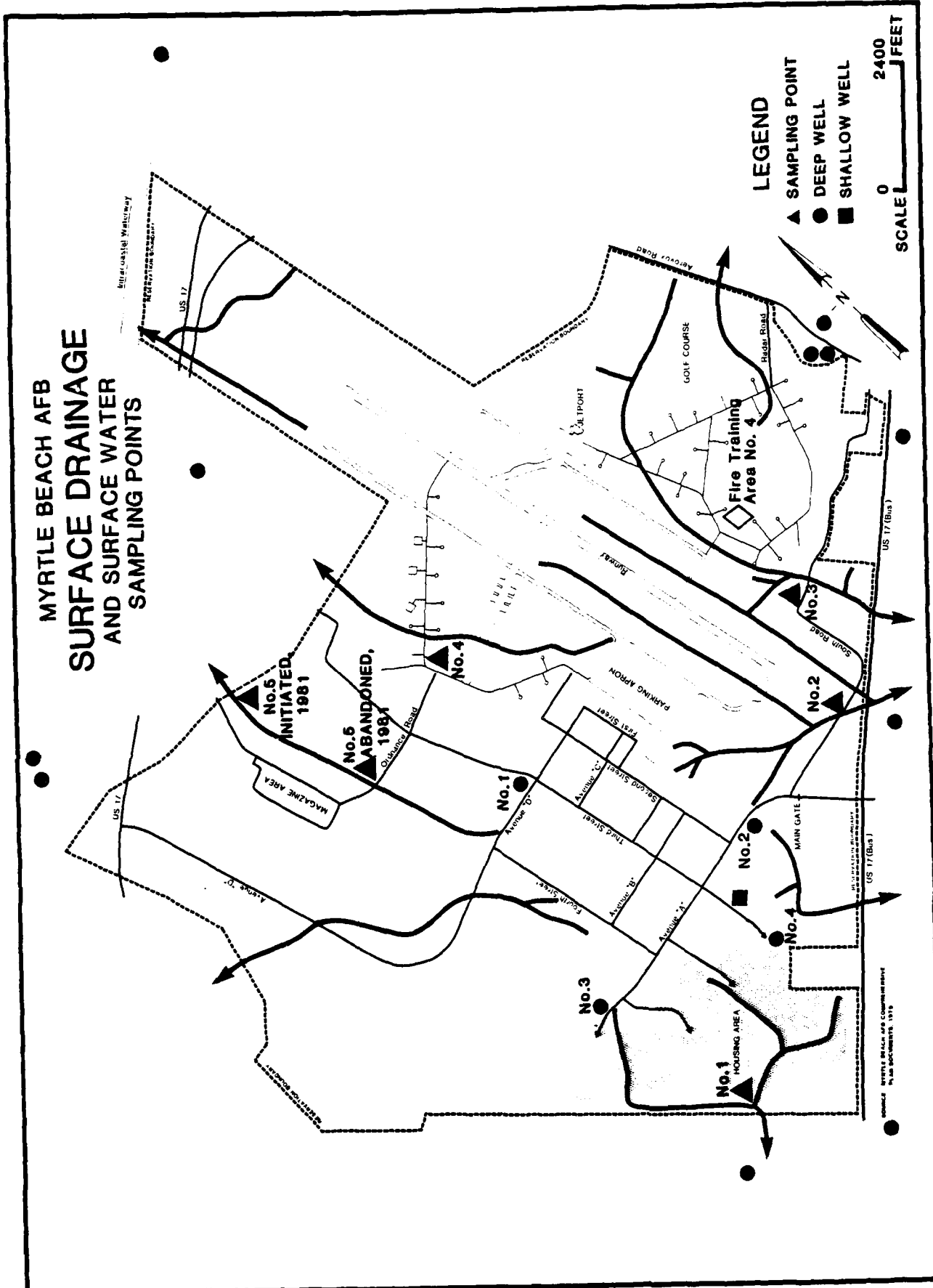
Topography

Topography of the Myrtle Beach Air Force Base area is due primarily to the deposition of both terrigenous and marine sediments, followed by their repeated reworking during changing sea level stands. Typically, surface elevations for the study area range from sea level to a maximum of 30 feet.

Drainage

Drainage of the Grand Strand area is accomplished by several natural streams and man-made waterways (See Figure 3.1). On base, man-made drainage alignments direct overland flow to local unnamed streams. Runoff

FIGURE 3.1



originating from the northern portion of the base is channeled to northward flowing streams draining into the Intracoastal Waterway. Runoff originating from the south and eastern parts of the base is directed to a southeast flowing stream that drains directly into the Atlantic Ocean.

Flooding is known to occur to approximate elevation 20 feet during a 100-year flood event on the Grand Strand (USGS, 1969). Flooding during such an event is not believed to have a major impact on Myrtle Beach Air Force Base operations as floodwaters would be confined to low areas and stream channels.

SURFACE GEOLOGY

The surface geology of the installation area has been summarized by Glowacz et al. (1980), as two distinct lithologic units of the Quaternary Age Socastee Formation (See Figure 3.2). The Socastee is reported to have a locally abrupt, irregular and unconformable contact with the subjacent Canepatch Formation. The unit contact is best exposed along the Intracoastal Waterway (ICW) northwest of Myrtle Beach and along the ICW where it parallels the installation boundary. The Socastee Formation has been mapped from the area near Wilmington, North Carolina, southward to the Santee River. The formation base varies in elevation from 20 feet below sea level at the coast to some 25 feet above sea level at its farthest inland occurrence. The Myrtle Beach Barrier sediments comprise that portion of the Socastee Formation occupying coastal areas, while the Myrtle Beach Backbarrier sediments occupy higher elevations inland.

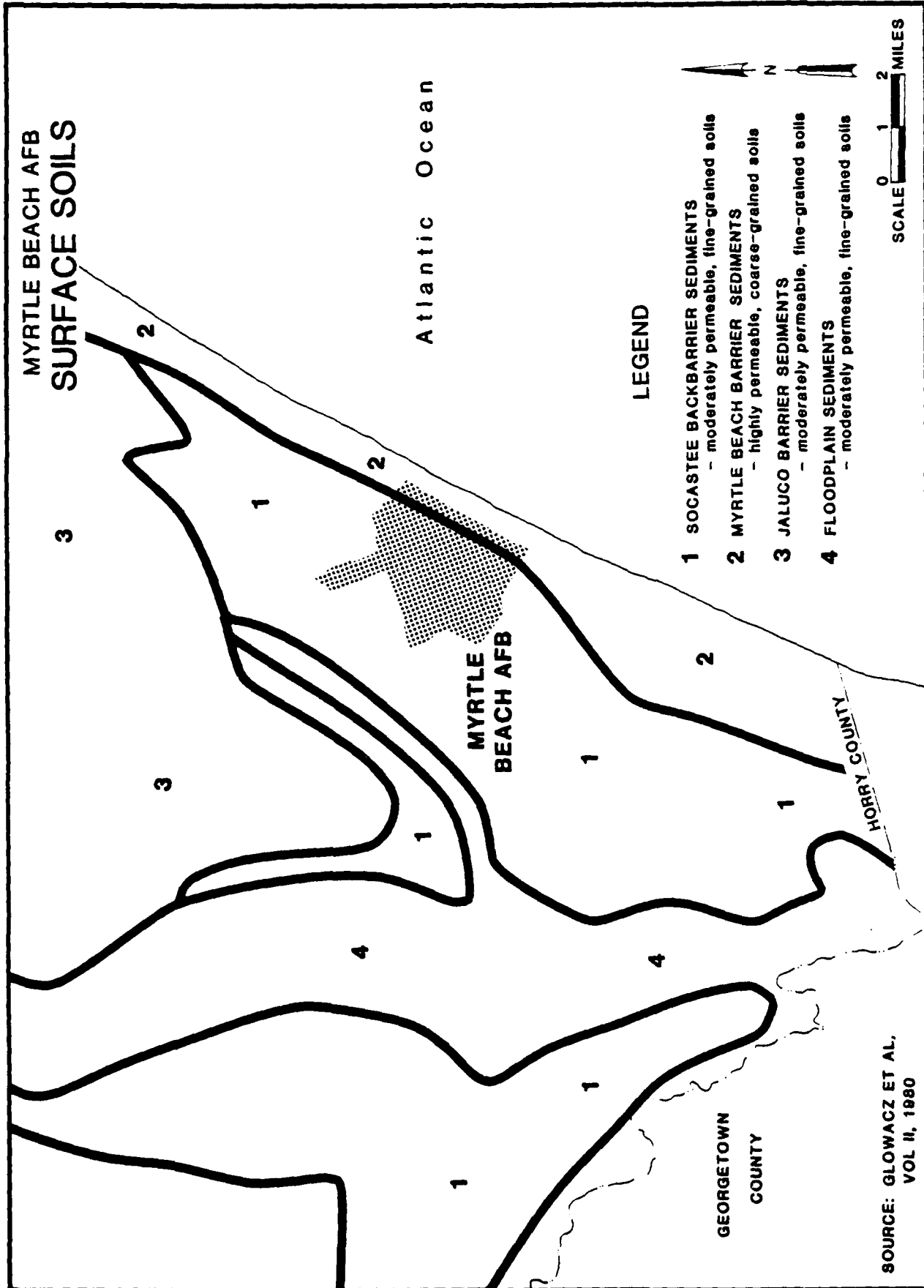
Myrtle Beach Barrier Sediments

Sediments of the Myrtle Beach Barrier consist of well sorted fine to coarse dune sands. These sands are well drained, highly permeable and are relatively free of fines (soil particles small enough to pass through a number 200 sieve). Typically, ground water is encountered at depths of five feet or less.

Myrtle Beach Backbarrier Sediments

These sediments occupy the flatlands behind the barrier zone. This unit typically consists of interlayered clays, silty sands, clayey sands and sands. Where present, the clay facies may range in thickness from four to twenty feet. Near the coast in the area of Myrtle Beach Air Force Base, the Backbarrier Sediments are underlain by sands of the Myrtle Beach

FIGURE 3.2



Barrier. This unit generally exhibits poor drainage characteristics due to a large fine fraction that restricts permeability to the low to moderate range and a high water table. Ground water is usually encountered at depths of five feet or less.

SOILS

Soils within the installation boundaries have been studied by numerous subsurface investigations supporting geotechnical (foundation) investigations and by the USDA, Soil Conservation Service, as a part of the Horry County soils study which is still in progress. At this time, limited Horry County soils information has been catalogued; however, no finalized soils survey data has been published.

SUBSURFACE GEOLOGY

Subsurface geology of the Horry County area has been reviewed by Glowacz et al. (1980) and is summarized as Table 3.1. Geologic units of the study area are typically unconsolidated soils with the exception of the Bear Bluff and Duplin Formations which contain some consolidated (sedimentary) rocks. A location map depicting geologic cross section orientations is presented as Figure 3.3. Cross-sections A-A' and B-B' are presented as Figures 3.4 and 3.5, respectively.

Coastal Plain geologic units of the Horry-Georgetown County area strike in a generally northeast-southwest direction and dip gently southeast (Zack, 1977). The dip has resulted from an accumulation of land-derived sediments along the coast and downward flexure of basement rocks. The downwarping is known to be of regional extent and causes numerous facies changes within local geologic units. Units tend to thicken downdip near the seacoast and are typically exposed updip (west). Geologic units present at Myrtle Beach at great depth include the Middendorf, Black Creek and Pee Dee Formations. All three of these units become considerably, thinner and crop out in the Upper Coastal Plain, west of Myrtle Beach (See Figure 3.6).

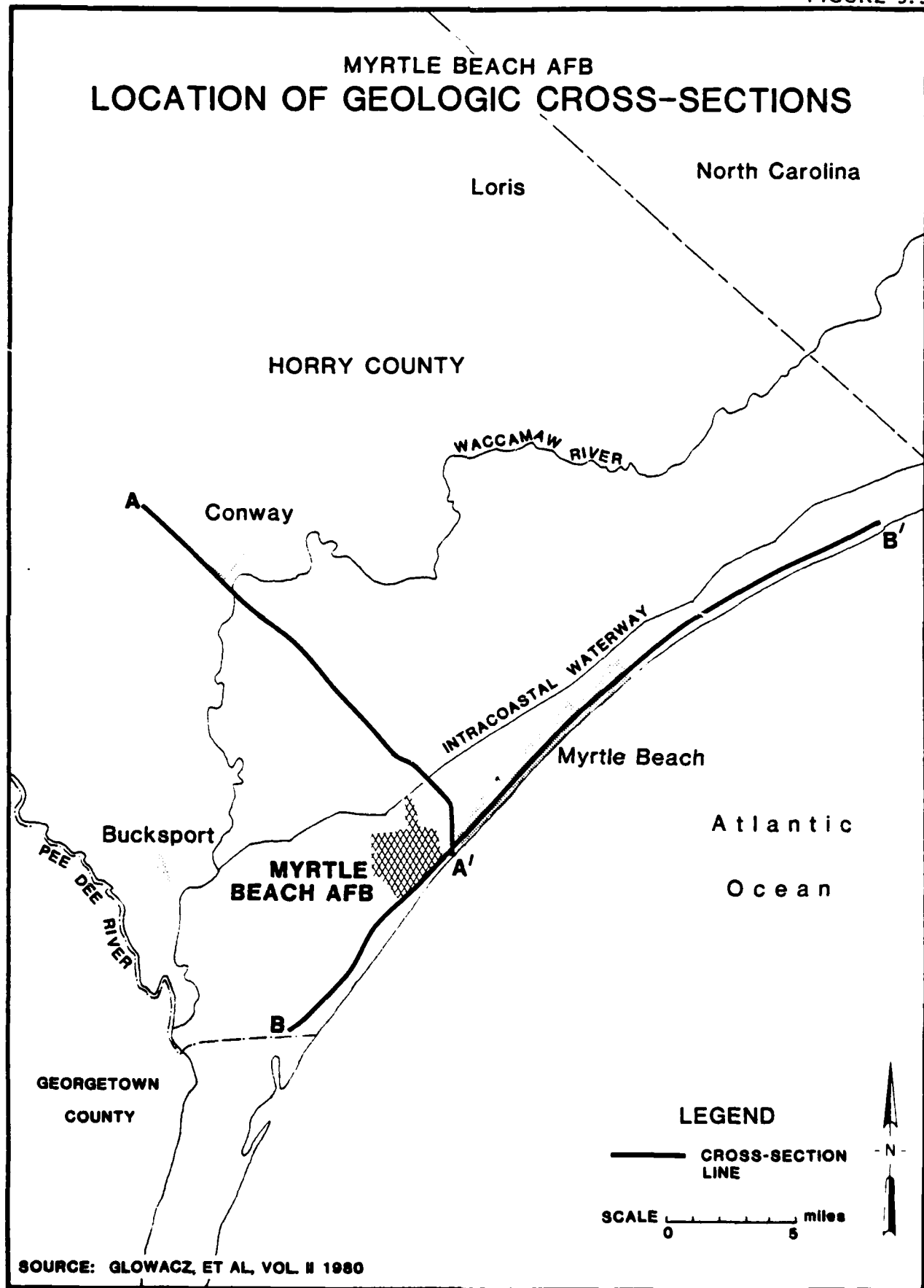
Table 3.1

Stratigraphic Units of the South Carolina Coastal Plain of Horry County

System	Series	Formation	Average Thickness (ft)	Depth (ft)	Description
Quaternary	Holocene	Undifferentiated			
	Pleistocene	Socastee			Light gray and buff, fine to coarse sands and interbedded clays, peats and peaty sands deposited under continental and nearshore conditions.
		Canepatch			
		Waccamaw			
Tertiary	Pliocene	Bear Bluff			Fine to coarse sands, argillaceous and silty sands and clays; deposited under littoral, marsh and estuarine conditions.
		Duplin		100	Clay, argillaceous, silty fine sand, and poorly sorted, medium to coarse sand; generally oxidized in upper part and unfossiliferous. Deposited under swamp, marsh, lagoon and estuarine conditions.
Cretaceous	Upper Cretaceous	Pee Dee	MAY be absent	152	Calcareous, fine to medium sands, commonly coarse at its base; fossils are sparse to abundant and well preserved, representing a range of brackish to open marine environments.
				100	Calcareous silts and sands, sandy limestones, and sub-arkosic sands, with fossils common.
				252	Deposited under open marine conditions.
				Varies	Sandy limestone, silty soft limestone, and calcareous silty sand with well preserved fossils. Occurs as erosional remnants. Deposited under open marine conditions.
			396	648	Medium dark gray, fine to very fine micaceous, glauconitic, muddy sand, with horizons of sandy, calcareous clay. Deposited under open marine conditions.
		Black Creek	627	1,275	Dark laminated clays interbedded with medium gray to yellowish-orange sands. Deposited under estuarine conditions.
		Middendorf (Tuscaloosa)	182	1,457	Cross-bedded sands with lenses of sandy to silty kaolin clays. Clays mottled from dark yellowish-orange to red and light red-purple. Deposited under fluvial conditions.
		Cape Fear (?)	155	1,612	Interbedded clay and sand. Lower unit consists of red and brown clay and less common feldspathic and conglomeratic sand. The middle section includes thinly interbedded silty clay and fine-grained sand overlain by noncalcareous micaceous clay.

SOURCE: Glowacz et al (1980), Vol. II, p. 3

FIGURE 3.3



MYRTLE BEACH AFB Structural cross-section, A-A', Horry County

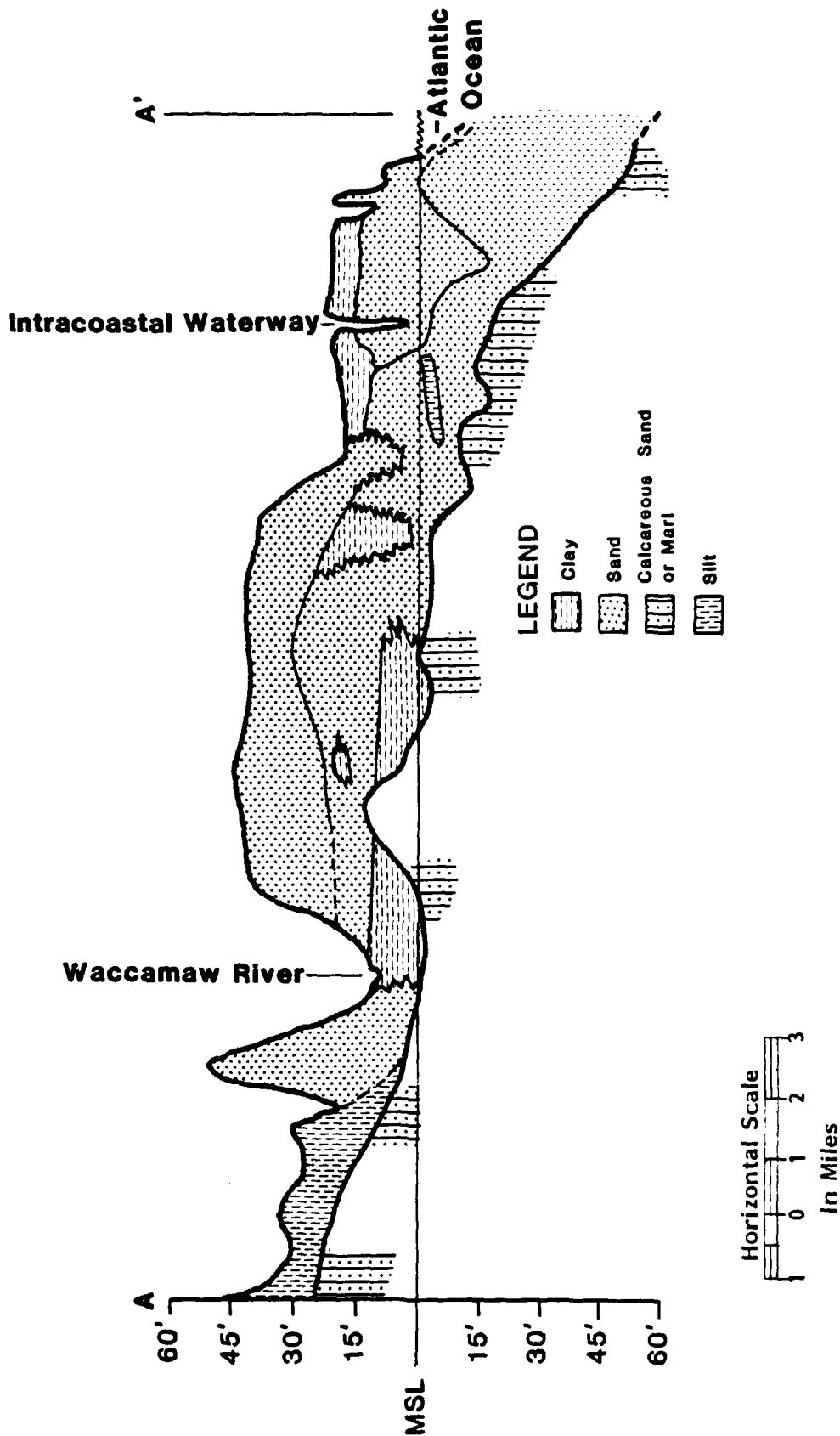


FIGURE 3.4

SOURCE: MODIFIED FROM GLOWACZ ET AL, VOL N, 1980

FIGURE 3.5

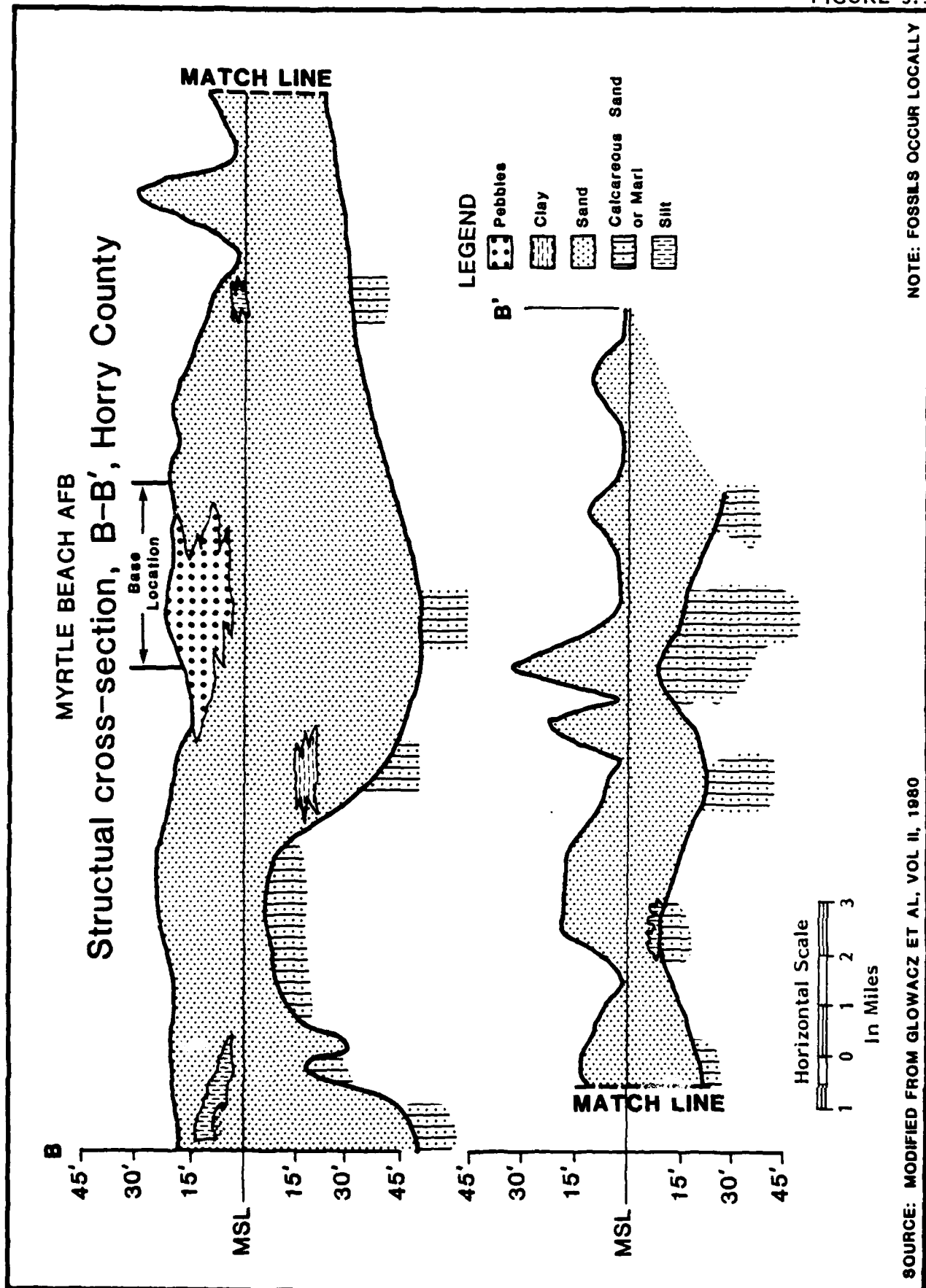
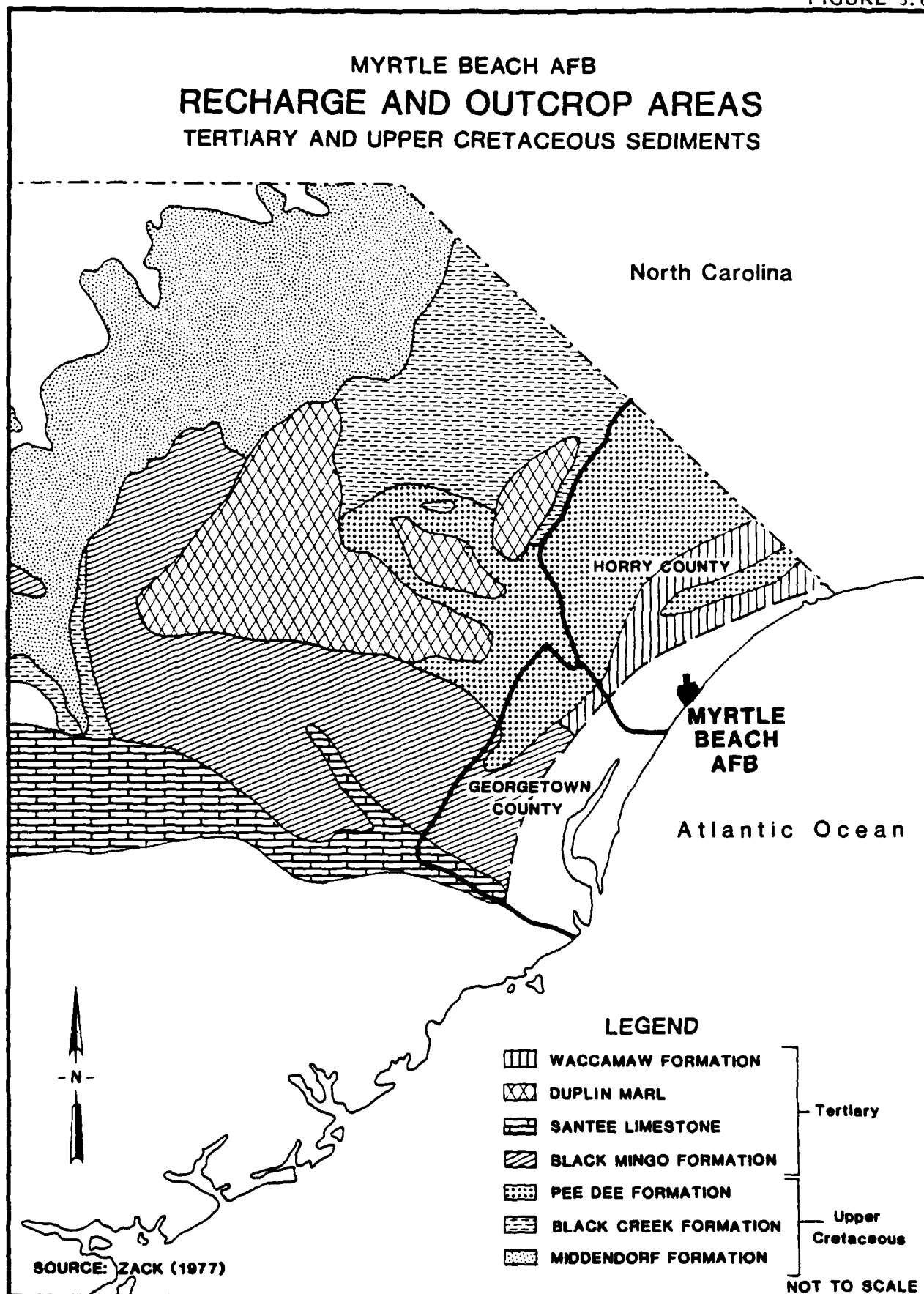


FIGURE 3.6



HYDROLOGY

Ground Water

Ground water resources of the project area have been investigated primarily by Glowacz (1980) and Zack (1977). Water bearing geologic units and related geologic informations are summarized as Table 3.2, which is modified from Zack (1977).

Hydrogeologic Units

Hydrogeologic units of the Myrtle Beach area include the water table aquifer, the Pee Dee System, the Black Creek System and the Middendorf (Tuscaloosa) System. A brief discussion of each follows:

(1) Water table aquifer. In Horry County, this hydrogeologic unit consists of some 100 feet of interlayered materials that may include parts or all of facies belonging to the Holocene Undifferentiated, Socastee, Canepatch, Waccamaw, Bear Bluff and Duplin Formations. The unit typically acts as a water-table (unconfined) aquifer, but may be confined locally for short distances. The water table is typically encountered within five feet of the ground surface. For this reason, many individuals use this water as a source of domestic or irrigation water. Water quality is usually good, but iron content can be excessive (See Table C.2). This unit is capable of producing large supplies if required.

Unit recharge is accomplished by precipitation falling on areas where permeable zones of the unit are exposed. No attempt has been made to quantify the amount of recharge.

The ground water flow directions within this unit have not been identified or mapped.

(2) The Pee Dee System. In Horry County, this unit consists of some 396 feet of sands, calcareous clays and clayey silts. Generally, water is contained in the Pee Dee under artesian (confined) conditions. The unit is used extensively in concert with the underlying Black Creek System as a source of potable water. Water quality is generally good; however, locally some excessive iron and sulfate concentrations have been observed, requiring treatment for municipal supply. According to Zack (1977) local separation occurs between the Pee Dee and the overlying Tertiary units. Because water in the sands of these two units does not move freely across aquifer

TABLE 3.2

HYDROGEOLOGIC UNITS

SYSTEM	SERIES	GEOLOGIC UNIT	DESCRIPTION OF SEDIMENTS	ASSOCIATED AQUIFERS	WATER-BEARING PROPERTIES
Quaternary	Holocene to Pleistocene	Undifferentiated Socastee (Cape Fear) Maccamaw	Blue-gray to yellow and brown sandy marl, gray to buff fine loose quartz sand.	Shallow water-table and artesian aquifers primarily in coastal Berry Co.	Water often hard, having some iron and hydrogen sulfide odor. Fair to large yields. Important in little River-Calabash area where fresh-water from other formations is unobtainable.
		Undifferentiated	Sands, silts, marls, and dark clays.	Water table and artesian aquifers. Primarily in inland Berry and Georgetown Counties.	Water usually hard, with hydrogen sulfide odor and iron.
Tertiary	Middle Eocene	Santee Limestone	Occurs only in inland Georgetown County; fossiliferous and calcareous.	Fractured carbonate-rock aquifer. Water table and artesian conditions.	Hydraulic properties undetermined. Supplies water to domestic wells in southwest Georgetown County.
	Lower Eocene and Paleocene	Black Mingo Formation	Greenish-gray glauconitic sands with thick beds of coquina (loose fossiliferous limestone). Occurs primarily in Georgetown County.	Shallow water-table and artesian aquifers primarily in Georgetown Co. (possible hydraulic connection with Pee Dee aquifer system locally).	Water quality usually poor but yields are locally high.
Cretaceous	Upper Cretaceous	Pee Dee Formation (Navarroan and Tayloran Age)	Gray to greenish-black calcareous glauconitic clayey silts and fine-grained sands with thin beds of gray calcareous sand and hard sandy limestone.	Pee Dee aquifer system.	Treatment for iron and sulfate removal required for municipal use. Yields are high.
		Black Creek Formation (Tayloran and Austinian Age).	Gray to greenish montmorillonitic clays and thin beds of gray to white slightly glauconitic sand. Thin beds of hard, sandy limestone containing pyrite, lignite, and possibly colophane.	Black Creek aquifer system.	Principal aquifer in the two-county area. Contains saline water in northeastern Berry Co. Yields as high as 1,000 gallons per minute have been obtained in Berry Co. Floridan is usually high.
		Middleton Formation (Tuscaloosa)	Light-colored cross-bedded kaolinitic sands with lenses of white massive kaolin. Lignite and pyrite common. Clays are non-calcareous.	Middleton aquifer system. (Tuscaloosa)	Contains salty water throughout area (possible exception along northwestern boundary of area).
	Pre-Tertiary	Basement	Basement rocks (metamorphic crystalline complex).	None.	None.

Source: Modified from Zuck (1977) p. 14

boundaries, it is assumed that most, if not all, recharge occurs by precipitation falling on areas west of Myrtle Beach where the Pee Dee out crops (See Figure 3.6). Water then may move downdip toward the Atlantic Ocean.

(3) The Black Creek System. In the study area, this unit consists of some 627 feet of interbedded sands and clays. Water occurs in this unit under artesian (confined) conditions. This unit is the most prolific and therefore the most widely used regional aquifer. Water quality is generally good and at present, it has been reported that capacities have not been exceeded by demand (Zack, 1977). According to Zack (1977), most recharge occurs where the unit is exposed, west of Myrtle Beach (See Figure 3.6). Water entering the system at this point then moves downdip toward the Atlantic. Other than long-term leakage, little recharge is thought to be received from the overlying Pee Dee due to short-term hydraulic independence of the Black Creek.

(4) Middendorf (Tuscaloosa) System. In the Horry County area, this hydrogeologic unit consists of some 182 feet of cross-bedded sands and silty kaolinitic clays. Water occurs in this unit under artesian (confined) conditions. Due to excessive chloride concentrations present in water derived from this system (on the order of 4000 mg/l), it is not used as a potable water source and detailed information characterizing this unit has not been developed. It is believed that this unit does function in much the same manner as the overlying Pee Dee and Black Creek Systems. The limited data available at present suggests that an effective and continuous clay barrier exists between the Middendorf and the overlying Black Creek (Zack, 1977).

According to Zack (1977) and Ransom (1981), ground water supplies for Grand Strand area may be described as "adequate," although some drawdowns have been observed in areas immediately adjacent to large (municipal) pumping centers. Excessive fluoride levels are also noted in some areas (Zack, 1980). In the event these problems might require the abandonment of present water sources, three possible alternative resource management procedures may be considered:

- o Use of surface waters
- o Use of surficial (water table) aquifer where viable
- o Conjunctive use of ground and surface waters

Potable Water Sources

Myrtle Beach AFB has four deep wells about 800 feet deep. At the present time, two of the wells' screens are clogged and the remaining two wells are being used (No. 1 and No. 3). These wells are shown in Figure 3.1. Adjacent to the base boundary are eleven deep wells. Correspondence from the State Water Resources Commission presented in Appendix D shows the relative well locations, owners and capacities.

Since the fluoride concentration is above recommended levels, the base also maintains a shallow well in the water table aquifer which has low fluoride levels. Individuals desiring low fluoride water must fill a water container at the well. Analytical data on the shallow well was previously presented in Table C.2. However no GC/MS data is available on the water well. Considering its shallow depth, the well should be monitored periodically for organic contaminants originating as surface infiltration.

Surface Water

The South Carolina Department of Health and Environmental Control has primary regulatory responsibility for the maintenance of water quality in the Myrtle Beach Air Force Base area. Regulation 68, Water Classification Standards System, sets forth the authority for the assignment of stream classifications for all state waters and the adoption of applicable standards. The existing standards applicable to classified waters adjacent to Myrtle Beach Air Force Base are presented in Appendix E and summarized as follows:

- (1) Coastal areas of Horry and Georgetown Counties are classified SA, as total salt waters suitable for the propagation, survival and harvesting of shellfish for market purposes.
- (2) The Intracoastal Waterway from its confluence with the Waccamaw River to a point where chloride concentrations exceed 250 mg/l (approximately where Route 17 crosses the Waterway) is classified A, as water suitable for direct contact use.

- (3) Unnamed Tributaries that may originate seasonally on the base, but do not possess individual classifications, must meet the classification standards of the receiving waters.

These standards are subject to review periodically, or on an interim basis where circumstances may so warrant.

WATER QUALITY MONITORING

Ground Water

Ground water quality monitoring is conducted at Myrtle Beach Air Force Base on a routine basis in order to comply with State Drinking Water Standards and AFR 161-44. A review of test data obtained by analyses of samples obtained from deep wells screened into the Pee Dee - Black Creek aquifer system indicates consistently high naturally occurring levels of sodium and fluoride. Test data from a shallow fluoride-free well, screened into the water table aquifer indicates naturally excessive iron levels. This well has been connected to an iron removal unit to control concentrations.

Fort Fisher AFS also conducts monitoring of water obtained from two deep wells used to supply drinking water. Monitoring is performed in accordance with State Drinking Water Standards and applicable Air Force Regulations. The Semiannual Bioenvironmental Engineering Staff Assist Visit conducted by MBAFB (report dated 31 May 1979) personnel noted that while drinking water obtained from Fort Fisher AFS wells was generally of acceptable quality, secondary water quality standards were exceeded by excessive levels of iron and zinc.

Surface Water

Water quality monitoring of surface waters at Myrtle Beach Air Force Base is conducted by Air Force personnel in order to comply with AFR 19-7 Environmental Pollution Monitoring. Surface water quality monitoring points (See Figure 3.1) established under the authority of the this AFR are identified as follows:

1. Housing area ditch
2. South runway ditch
3. Fire training area

4. Engine test cell
5. Ordnance road ditch (Sampling point relocated in 1981 -
See Figure 3.1)

A review of water quality monitoring data indicates that discharges are in compliance with applicable requirements.

In addition, Myrtle Beach Air Force Base currently has one State Pollutant Discharge Elimination System (SPDES) permit and one S.C. Board of Health Permit. South Carolina SPDES Permit Number SC0002097 and State Board of Health, Water Pollution Control Authority Permit Number 105-4/16/56 authorize the discharge of treated wastewater effluent to the Intracoastal Waterway. Operation of the base sewage treatment plant is scheduled to be phased out during calendar year 1981 when Myrtle Beach Air Force Base will connect to the Grand Strand Water and Sewer Authority regional wastewater treatment system.

Non-Installation Discharges to Regional Waters

The City of Myrtle Beach currently operates a sewage treatment plant that discharges to the Intracoastal Waterway (ICW) at a point source 1.5 miles east of the Myrtle Beach Air Force Base discharge. This is the only major proximate discharge that may adversely impact area water quality.

Numerous unmapped septic tanks are known to exist in the Grand Strand area. These facilities primarily serve domestic requirements. Due to their great number, it is suggested that they probably exert an adverse impact on surficial aquifer quality as well as surface water quality because of the large organic contribution and Shallow ground water table. (Glowacz et al, 1980). This problem is expected to be abated when most of these domestic sewage sources join the regional water treatment system.

Fort Fisher AFS located at Kure Beach, North Carolina, monitors surface water quality under the provisions of AFR 19-7. In addition the station has an NPDES Permit Number NC 0007846 for their wastewater treatment plant. All monitoring is performed by a contractor (Law and Company). Discharges generally fall within required limits, however, the Semiannual Bioenvironmental Engineering Staff Assistance visit performed by MBAFB personnel noted that suspended solids were "high" in a report dated 31 May 1979. The operation of the station's treatment facility is scheduled to be phased out during calendar year 1981 when the station is to join a regional wastewater treatment system.

ENVIRONMENTALLY SENSITIVE CONDITIONS

As a result of our on-site visit, the following conclusions have been reached with regard to the environmental sensitivity of Myrtle Beach AFB. There are no wetlands nor any known threatened or endangered plant species on the base property.

Groundwater

- The uppermost aquifer at Myrtle Beach AFB is the water table aquifer. The ground water table varies from six inches to five feet below the ground surface. The fluoride level in this aquifer is substantially lower than deeper ground water but has a relatively high iron content. Myrtle Beach AFB is constructed in the recharge zone for the water table aquifer. Therefore leachate or chemical discharges will rapidly percolate into this sandy aquifer. No information is available on ground water movement.
- The Pee Dee System consists of 396 feet of sands, clays and clayey silts. Water in this aquifer is artesian and of good quality. Recharge occurs by precipitation falling on areas west of Myrtle Beach where the Pee Dee out crops.
- The Black Creek System consists of 627 feet of interbedded sands and clays. Water occurs in this unit also under artesian conditions. This unit is the most prolific and therefore the most widely used regional aquifer. Recharge in this unit like the Pee Dee is west of Myrtle Beach where the unit is exposed. Little recharge is thought to be received from the overlying Pee Dee formation.

Water Supply

- The base has a well in the water table aquifer which is used as a source of low fluoride water. The well is not tied into the water distribution system but

is available to individuals willing to fill a container. GC/MS data should be periodically collected from the well to safeguard against organic contamination.

Low income housing and trailer parks surrounding the base have city water available but some may be on shallow wells. No information on small residential wells is available.

- The base's deep wells are constructed to draw upon the Pee Dee and Black Creek units. Given the local geology, it is unlikely that leachate or hazardous waste discharges would migrate to these aquifers.
- There are eleven wells in the Pee Dee and Black Creek units adjacent to the base's boundary.
- Future well construction on the base should be undertaken to minimize the possibility of contaminated surface waters traveling down the well casing to pollute deeper formations.

Threatened and Endangered Species

- The habitat on the base is a conducive environment for the red-cockaded woodpecker and alligator. There are no known alligators or woodpeckers presently on the site.

Surface Water

- Surface runoff from the base drains to the Atlantic Ocean and Intracoastal Waterway. Both bodies of water have the state's highest water use classification for saline and freshwater.
- The high visibility of the beach area and waterway have required the base to address floating oils and solids for many years before typical environmental regulations took affect.

CHAPTER 4
FINDINGS

CHAPTER 4

FINDINGS

To assess hazardous waste management at Myrtle Beach AFB, past activities of waste generation and disposal were reviewed. This chapter contains a summary of the wastes generated by activity, a description of disposal methods used at Myrtle Beach AFB, and an identification and evaluation of disposal sites located on the base. Figure 4.1 presents the decision tree utilized in the review of past waste practices. This tree provided a logical algorithm for the consistent evaluation of all base practices.

PAST ACTIVITY REVIEW

To determine past activities on the base that resulted in generation and disposal of hazardous waste materials a review was conducted of all current and past waste generation and disposal methods. This review consisted of interviews with base employees, a search of files and records, and site inspections.

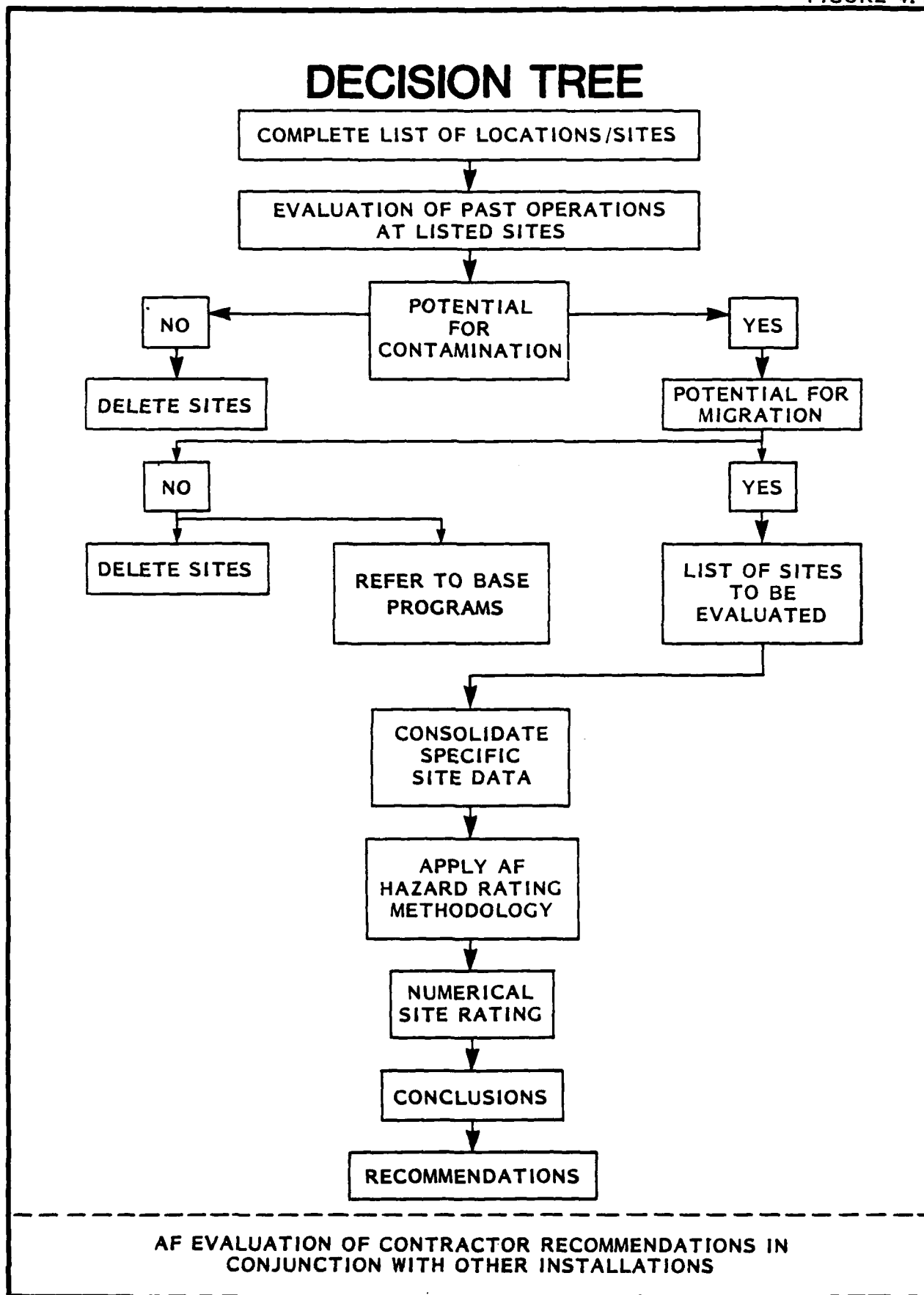
Waste Generated by Activity

All hazardous wastes generated on Myrtle Beach AFB can be associated with one of the following six activities carried out on base:

- Industrial Operations (Shops)
- Pesticide and Herbicide Utilization
- Radioactive Waste
- Fire Control Training
- Hazardous Waste Storage
- POL (Fuels Management)

The following discussion addresses only those wastes generated on base which are either hazardous or potentially hazardous. In this discussion, a hazardous waste is defined as hazardous by either the Resource Conservation and Recovery Act (RCRA), or the Myrtle Beach documents which have been reviewed. A potentially hazardous waste is one which was suspected of being defined under RCRA as hazardous although insufficient data was available to fully characterize the waste.

FIGURE 4.1



Industrial Operations (Shops)

Major mission support activities are conducted at Myrtle Beach AFB by various groups and squadrons through industrial shops. These shops maintain, fabricate and repair components and parts of aircraft and ground equipment. A list of industrial shops was obtained from the Environmental Health Services Office of the Base Hospital. This list contained those shops where toxic/hazardous materials were and are used, stored, treated, or disposed on the base. This list is maintained for base surveys of occupational health and safety compliance concerns by the Environmental Health Services Office. A list of these industrial shops and their building locations is shown in Table 4.1.

The list of shops presented in Table 4.1 was reviewed by personnel from the Environmental and Contract Planning Section of the Civil Engineering Squadron. Those shops which may pose a potential for contamination of ground waters were considered further for on-base interviews. Shops interviewed are indicated in Table 4.1. A brief description of the shops is presented in Appendix F.

During the shop interviews, ES personnel were accompanied by personnel from the Maintenance Analysis Section and the Civil Engineering Squadron. The information obtained is presented in Table 4.2 and contains types of materials used, materials disposed, the quantities of materials disposed, and the past disposal practices. The shop interviews resulted in generating two general types of information - listings of hazardous wastes generated, and identified past and present disposal practices. The results of the interviews indicated that the solvent PD-680 and its predecessor (PS-661) have been the most readily used chemicals in these shops. Also waste engine oil and waste hydraulic fluid are commonly disposed materials. Shops with past disposal problems include the AGE, Wheel and Tire Shop, Armaments, Transportation and Power Production.

The AGE and Wheel and Tire Shop discharged PD-680 to the drainage ditch. This practice was discontinued in 1980. Both Transportation and Power Production discharge neutralized waste battery acid to the sanitary sewer. This acid is high in heavy metals and could, if in sufficient quantity, accumulate in the treatment plant sludge. It is felt that the quantities to date have not posed a problem.

TABLE 4.1
INDUSTRIAL OPEATIONS UTILIZING
TOXIC/HAZARDOUS MATERIALS

Shop Name	Location (Bldg. no.)	Shop Name	Location (Bldg. no.)
<u>354th CRS</u>		<u>354TH CES</u>	
* Machine Shop	352	* Entomology Shop	220/562
Metals Processing	352	Heating Shop	220
Electric Shop	352	* Liq. Fuels/Maint.	220
Structural Repair	352	Shop	
* Non-Destructive		* Paint Shop	217
Inspect (NDI)	352	* Plumbing Shop	220
* Wheel & Tire Shop	352	* Power Production	220
* Engine Shop	324	Refrigeration Shop	220
* Pneudraulics Shop	324	Structural Maint.	221
Aero Repair Shop	352	Welding Shop	221
<u>354th EMS</u>		<u>Base Hospital</u>	
* Aircraft Ground Equip-		* Hosital Lab	114
ment Repair (AGE)	320	* Hospital Operating	
Non-power AGE shop	324	Room	114
Fuels System Repair	328	* Medical X-ray Lab	114
* Corrosion Control	355	Dental Lab	334
* Armanent Shop	505		
* Missile Maint.	581	<u>Other Areas</u>	
* Munitions Equip-		* Photo Lab	502
ment Maint.	580	* Fuels Lab	518
Conventional Muni-		* Small Arms Range	544
tions Maint.	587	* Auto Hobby Shop	255
		Radar Maint.	364
<u>354th Trans. Sqdn.</u>		Precision Measure-	
* Paint Shop	514	ment Equipment	
* Refueling Maint.	516	Lab (PMEL)	519
* Welding Shop	514	Electronic Counter-	
* Battery Shop	514	measure (ECM) Shop	325
* Gen. Maint.	514	AGE Vehicle Maint.	454
<u>38th ARRS, Det. 11, MAC</u>		* Base Service Station	200
* Helicopter Maint.			
Shop	359		

* These shops were visited during the base survey since they were designated by base personnel as utilizing toxic/hazardous materials in quantities which could pose a potential for ground water contamination.

TABLE 4.2
INDUSTRIAL OPERATIONS (Shops)
WASTE GENERATION

1 of 4

SHOP NAME	LOCATION (BLDG. NO.)	WASTE MATERIAL	WASTE QUANTITY (1)	METHOD(S) OF TREATMENT, STORAGE & DISPOSAL		
				1960	1970	1980
AIRCRAFT GROUND EQUIPMENT (AGE) SHOP	320	PD-680/PS-661 AIRCRAFT CLEANING COMPOUND HYDRAULIC FLUID WASTE OIL	10-15 GALS./MO. (INCLUDED WITH PD-680) (INCLUDED WITH PD-680) APPROXIMATE 170 GALS./MO.	WASH DOWN TO OCEAN	WASH DOWN TO OCEAN	O/W SEPARATOR TO SANITARY STORM SEWER
				WASH DOWN TO OCEAN	WASH DOWN TO OCEAN	O/W SEPARATOR TO SANITARY STORM SEWER
				WASH DOWN TO OCEAN	WASH DOWN TO OCEAN	O/W SEPARATOR TO SANITARY STORM SEWER
				DRUMMED THEN SENT TO DPDO (3)	DRUMMED THEN SENT TO DPDO (3)	DRUMMED THEN SENT TO DPDO (3)
PNEUDRAULICS SHOP	324	PD-680/PS-661 HYDRAULIC FLUID	5-10 GALS./MO. 5 GALS./MO.	HOLDING TANK TO DPDO	HOLDING TANK TO DPDO	
				HOLDING TANK TO DPDO	HOLDING TANK TO DPDO	
ENGINE SHOP	324	TURCO ACID (2) PD-680 CARBON REMOVER (2)	4-5 GALS./MO. 5 GALS./4 MOS. 3 GALS./4 MOS.	METHOD UNKNOWN	NEUTRALIZATION THEN TO STORM SEWER	
				DRUMMED THEN TO DPDO	DRUMMED THEN TO DPDO	
				DRUMMED THEN TO DPDO	DRUMMED THEN TO DPDO	
MACHINE SHOP	352	FLOOR SWEEPING COMPOUND, RAGS CUTTING FLUIDS LUBRICATING OILS	5 lbs./MO. 10-15 GALS./YR. 5-10 GALS./YR.	BASE LANDFILL	COUNTY LANDFILL	
				HOLDING TANK TO DPDO	HOLDING TANK TO DPDO	
				HOLDING TANK TO DPDO	HOLDING TANK TO DPDO	

KEY

----- CONFIRMED TIME FRAME DATA BY SHOP PERSONNEL

----- ASSUMED TIME FRAME DATA BY SHOP PERSONNEL

(1) Based on current rates and best estimates of past rates

(2) Carbon remover is a compound composed of glycol ethers, monoethanolamine and water. Turco acid contains highly concentrated phosphoric acid.

(3) Temporary storage by Fuels Management, pending disposal by DPDO.

(4) Phenolic and non-phenolic paint stripper have been and are used.

(5) For description see note on sheet 1 of 4.

TABLE 4.2 (cont'd)
INDUSTRIAL OPERATIONS (Shops)
WASTE GENERATION

2 of 4

SHOP NAME	LOCATION (BLDG. NO.)	WASTE MATERIAL	WASTE QUANTITY	TREATMENT, STORAGE & DISPOSAL 1960 1970 1980	METHOD(s) OF
NON-DESTRUCTIVE INSPECTION (NDI) SHOP	352	PENETRANT DEVELOPER FLOUR & WATER EMULSIFIER FLOUR & WATER METHYL ISOBUTYL KETONE TEST OIL SAMPLES	60 GALS./3 YRS. 60 GALS./3 YRS. 60 GALS./3 YRS. 1-2 GALS./MO. 55 GALS./YR.	1960: FIRE PIT 1970: SEWAGE TREATMENT PLANT 1980: DSA SALVAGE DSA SALVAGE (PART OF ENGINE SHOP) DSA SALVAGE (PART OF ENGINE SHOP)	ENGINE SHOP TO DPDO ENGINE SHOP TO DPDO CORROSION SHOP DRUM ENGINE SHOP TO DPDO ENGINE SHOP TO DPDO
WHEEL AND TIRE SHOP	352	PD-680	50-55 GALS./MO.	TO STORM SEWER DRAIN CORROSION CONTROL TO DPDO	DRUMMED THEN TO CORROSION CONTROL TO DPDO
CORROSION CONTROL SHOP	355	PAINT STRIPPER (a) METHYL ETHYL KETONE TOLUENE	100 GALS./5 MOS. 10 GALS./MO. 5 GALS./MO.	O/W SEPARATOR, THEN STP DSA SALVAGE DSA SALVAGE	DRUMMED TO CONTRACTOR PICK-UP DRUMMED TO CONTRACTOR PICK-UP

(a) Phenolic and non-phenolic paint stripper have been and are used.

KEY
—— CONFIRMED TIME FRAME DATA BY SHOP PERSONNEL
----- ASSUMED TIME FRAME DATA BY SHOP PERSONNEL

TABLE 4.2 (cont'd)
INDUSTRIAL OPERATIONS (Shops)
WASTE GENERATION

3 of 4

SHOP NAME	LOCATION (BLDG. NO.)	WASTE MATERIAL	WASTE QUANTITY	TREATMENT, STORAGE & DISPOSAL 1960 1970 1980	METHOD(s) OF
HELICOPTER MAINTENANCE SHOP	359	PD-680 OIL, LUBRICANTS PAINT REMOVER METHYL ETHYL KETONE WASTE FUEL	55 GALS./2 MOS. 55 GALS./4 MOS. (INCLUDED WITH PD-680) (INCLUDED WITH PD-680) 50 GALS./MO.	DRUMMED, THEN TO DPDO DRUMMED, THEN TO DPDO DRUMMED THEN DPDO DRUMMED THEN DPDO DRUMMED, THEN TO DPDO	DRUMMED, THEN TO DPDO DRUMMED, THEN TO DPDO D/W SEPARATOR TO SANITARY STORM SEWER D/W SEPARATOR TO SANITARY STORM SEWER DRUMMED, THEN TO DPDO
ARMAMENTS SHOP	505	PD-680 CARBON REMOVER (5) TRICHLOROETHANE	400 GALS./5 MOS. <1 GAL./MO. <1 GAL./MO.	DSA SALVAGE INCLUDED WITH PD-680 INCLUDED WITH PD-680	U.G. TANK THEN DPDO INCLUDED WITH PD-680 INCLUDED WITH PD-680
MUNITIONS EQUIPMENT MAINTENANCE SHOP	580	PD-680	4-5 GALS./MO.	DRUMMED THEN TO DPDO	DRUMMED THEN TO DPDO
MISSILE MAINTENANCE SHOP	581	SPRAY PAINT CANS, 16 oz. TRICHLOROETHANE ON RAGS, TRASH DENATURED ALCOHOL ON RAGS, TRASH	40 EACH/MO. <1 GAL./MO. <1 GAL./MO.	REFUSE CONTRACTOR'S TO COUNTY LANDFILL REFUSE CONTRACTOR'S TO COUNTY LANDFILL REFUSE CONTRACTOR'S TO COUNTY LANDFILL	REFUSE CONTRACTOR'S TO COUNTY LANDFILL REFUSE CONTRACTOR'S TO COUNTY LANDFILL REFUSE CONTRACTOR'S TO COUNTY LANDFILL

KEY

CONFIRMED TIME FRAME DATA BY SHOP PERSONNEL

ASSUMED TIME FRAME DATA BY SHOP PERSONNEL

(5) For description see note on sheet 1 of 4.

TABLE 4.2 (cont'd)
INDUSTRIAL OPERATIONS (Shops)
WASTE GENERATION

4 of 4

SHOP NAME	LOCATION (BLDG. NO.)	WASTE MATERIAL	WASTE QUANTITY	METHOD(s) OF TREATMENT, STORAGE & DISPOSAL 1960 1970 1980
PAINT SHOP	218	MINERAL SPIRITS EMPTY PAINT CONTAINERS	55 GALS. /6 MOS.	FIRE TRAINING/ DPDO LANDFILL DPDO ON BASE
POWER PRODUCTION (CES)	220	WASTE BATTERY ACID	5 GALS. /YR.	NEUTRALIZED TO SANITARY SEWER
TRANSPORATION MAINTENANCE	514	WASTE OIL WASTE BATTERY ACID	500 GALS. /MO.	TO DPDO NEUTRALIZED TO SANITARY SEWER
PHOTO LAB	502	FIXER DEVELOPER	35 GALS. /WK. 5 GALS. /MO.	ION EXCHANGE, ELECTROLYTIC RECOVERY TO SANITARY SEWER
HOSPITAL X-RAY LAB	114	FIXER DEVELOPER	-	TO PHOTO LAB FOR RECOVERY TO SANITARY SEWER
AUTO HOBBY SHOP	255	WASTE OIL	1000 GALS. /4 MOS.	CONTRACTOR DISPOSAL
BASE GAS STATION	200	WASTE OIL	500 GALS. /2 MOS.	CONTRACTOR DISPOSAL

KEY
 ——— CONFIRMED TIME FRAME DATA BY SHOP PERSONNEL
 - - - - - ASSUMED TIME FRAME DATA BY SHOP PERSONNEL

Pesticide and Herbicide Utilization

Pesticides and herbicides have been used on MBAFB to maintain the proper control of pest infestations and ground foliage, respectively.

The following is a listing of common pesticides and herbicides which are used as well as container disposal procedures:

<u>Chemical</u>	<u>Container Disposal</u> <u>Method</u>
Malathion	Drums to Salvage - if damaged to landfill
Diazinon	Five gallon cans to landfill
Hyvar XL	Five gallon cans to landfill
Dalapon	Fifty-five lb. boxes to landfill
Sevin	Five gallon cans to landfill
Trimec	Drums to Salvage - if damaged to landfill

At the present time, the base uses about 1 1/2 drums per year of malathion and much lesser amounts of other chemicals. In the past, DDT was the primary pesticide used on the base until it was discontinued in the 1958 to 1960 period.

Excess chemicals are sprayed at the application area and little excess is returned to the Entomology Shop. Spray vehicle wash water is discharged to Weathering Pit No. 2 or to the oil-water separator located between the Wastewater Treatment Plant and the Entomology Shop.

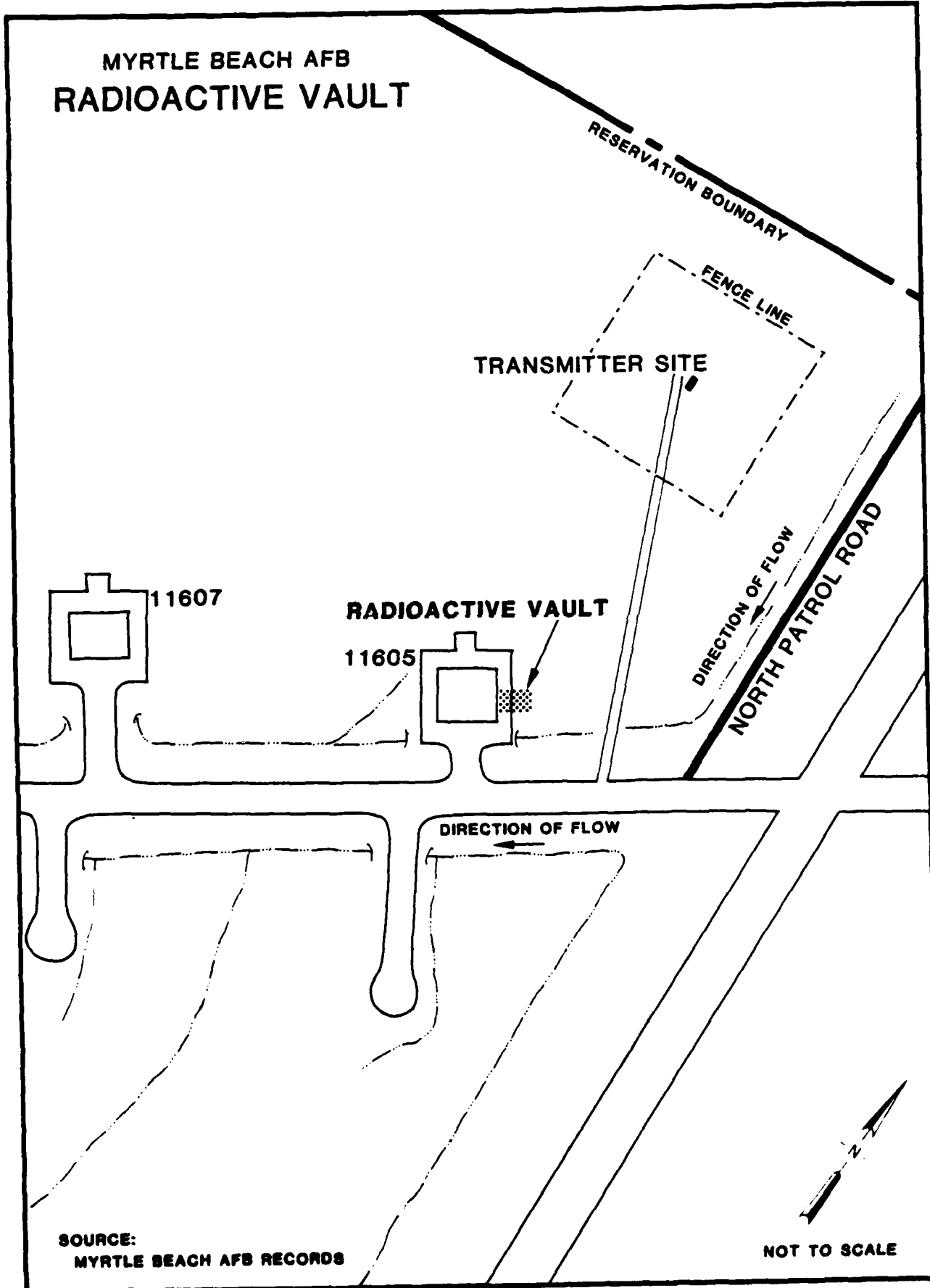
Radioactive Vault

At the present time, there are only two sources of radioactive wastes on the base - Precision Measurement Equipment Laboratory and the Magazine Area where 30mm rounds are stored. No wastes are permanently stored on base. In 1959, a concrete vault was constructed adjacent to the taxiway as shown in Figure 4.2. Two radio tubes were placed in the vault. Thereafter the area around the vault was regraded and the vault is now not indicated as a radioactive site. No one knows if anything was in the vault when it was regraded.

Fire Control Training

The Fire Control Department has operated four fire training areas since 1955. These areas have and continue to serve as a practice burning/extinguishing area, where petroleum based fires are set and thereafter extinguished. The following are specific designations for

FIGURE 4.2



the individual training areas as well as their approximate operational period (See Figure 4.3):

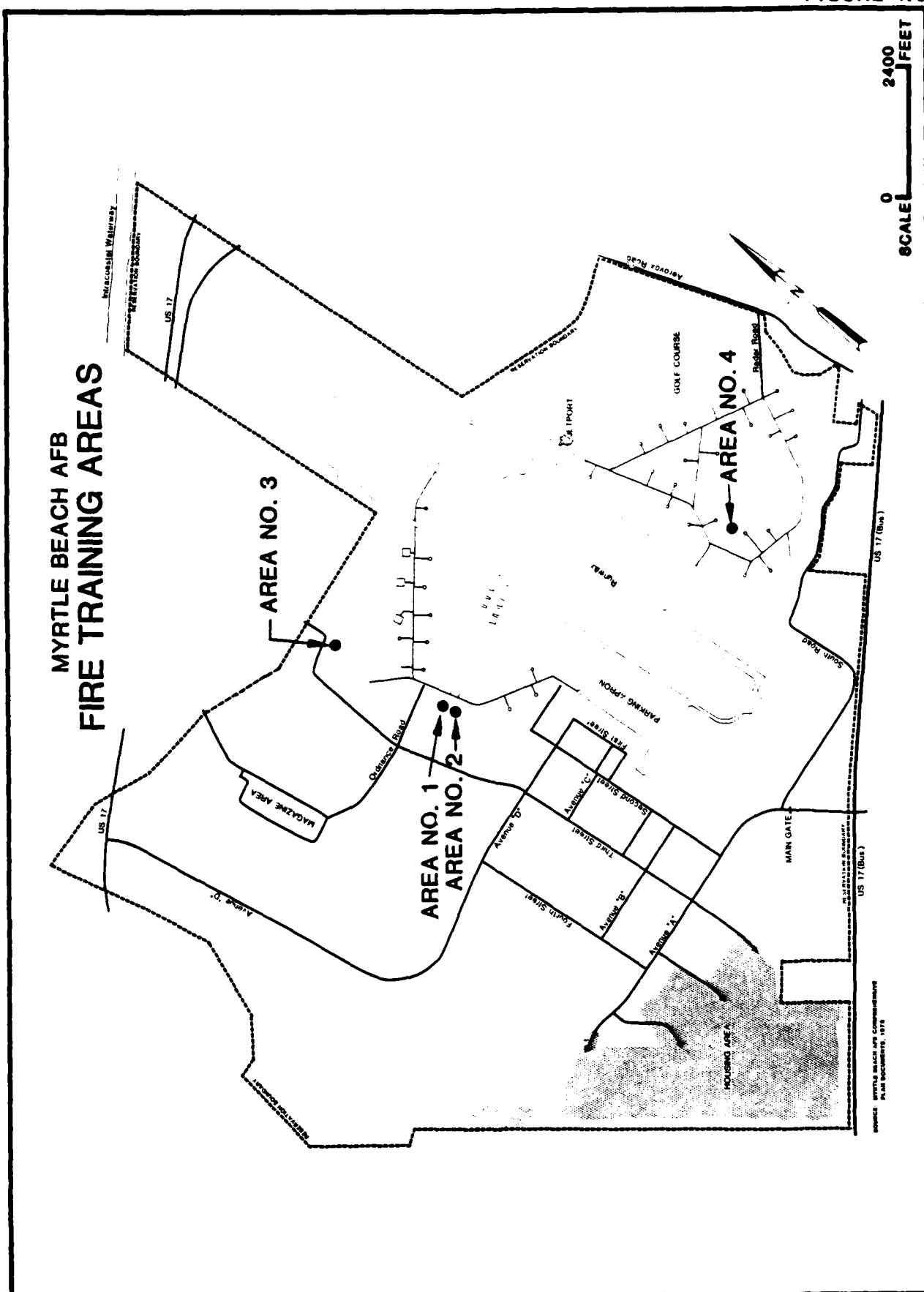
<u>Fire Training Area</u>	<u>Period of Operation</u>
1-2	1955-1964
3	1965-1969
4	1970-1981

In the past, the common mode of operation was for the Fire Control Department to collect waste fuels, oils, solvents, and contaminated fuel and to utilize this for fire training exercises. In the late 50's and early 60's, this mechanism provided a two-fold purpose - it allowed for fire training (at least two to three times per week) and it disposed of the majority of the flammable petroleum based products generated on the base.

The procedure utilized in fire training areas No. 1, 2 and 3 was to construct an earthen dike approximately 12 to 18 inches high in order to contain the fire and to pour the fuel onto the soil within the dike and to set the fuel on fire. Chemicals were then applied to extinguish the fire. As air pollution regulations became more stringent in the mid 60's, the fire training exercises were curtailed severely. This schedule has in turn been modified until at the present time there are two fire training exercises per quarter and the fuel utilized is uncontaminated JP-4 fuel. The current procedure utilized in area No. 4 is to flood the area with 1500 gallons of water and then to place 300 gallons of JP-4 on top of the water surface. The advantage to this procedure is that it minimizes the percolation of the fuel into the soil. The other reason this procedure is being followed is that the fire department must purchase the JP-4 and the water flooding procedure minimizes overall fuel consumption.

To extinguish a typical fire, the fire department uses approximately 50 gallons of a fire control agent, AFFF mixed with an additional 1500 gallons of water. The concentrated agent has a chemical oxygen demand approximating 400,000 milligrams per liter (mg/l) which for a

FIGURE 4.3



typical fire training exercise would be equivalent to 166 lbs of COD. The chemical AFFF has been used since 1972, previous to that a protein foam was utilized as an extinguisher.

At the present time, there are approximately 83 chlorobromomethane extinguishers which are currently in use at the base. As each extinguisher must be recharged, it is sent to DPDO and replaced with a different unit. In the past, these extinguishers were not disposed of in the landfill but were always salvaged.

Hazardous Waste Storage

The Defense Property Disposal Office (DPDO) is located in Building 526 at Myrtle Beach Air Force Base and furnishes disposal for excess surplus property generated by the Department of Defense (DOD activities within the base). One responsibility of DPDO is to provide interim storage for hazardous waste before shipment to Charleston where DPDO has their major disposal operation for this region. The storage area adjacent to building 526 is fenced in and controlled. The major hazard in this area is that of a potential spill. The drums which are stored are unprotected from rain and sun so that some rusting may ensue. The storage area is not diked and there is some potential for spilled material leaving the storage site. No spills have been reported to date.

Fuels Management

Myrtle Beach AFB maintains supplies of several types of liquid fuels. The largest of these by volume used, is jet aircraft fuel, JP-4 at approximately 1.5 million gallons per month. Other fuels include No. 2 and 5 heating oil, kerosene, LP gas, diesel fuel and automotive gasoline both leaded and unleaded. The previous fuels are stored throughout the base in both above ground and below ground storage tanks.

Table C.3 lists all of the 35 underground fuel storage tanks located within the base facility. Included in the table is the nearest building number and the individual tank capacity. The underground storage tanks have been identified due to the potential for contamination of the upper ground water aquifer from undetected leaks. At the present time, none of the below ground storage tanks are monitored for possible leaks. The only requirement is that tanks 25,000 gallons or over be checked using a differential level measurement on two successive

days in order to detect any leaks. This procedure would include only three of the previously identified 35 underground storage tanks.

Waste and Recoverable Petroleum Products

Used or contaminated petroleum products are either filtered for reuse or disposed of through DPDO by a private contractor. Contaminated or suspected JP-4 recovered from spills, refueling or other operations is tested by the Petroleum, Oil and Lubricants (POL) Laboratory to determine the purity of the fuel. Prior to reentry into the base's fuel system, the JP-4 passes through a filter system. JP-4 which is considered too contaminated for reuse is stored in a 10,000 gallon contaminated fuel tank. When a substantial quantity of contaminated fuel is available for sale, DPDO in Charleston is contacted to arrange the sale.

Waste oils, lubricants and hydraulic fluid are collected near their generation point in either small bowzers or barrels. The waste oils are segregated as either mineral oil (crank case oil) or synthetic oil (jet engine oil). The waste oils are delivered to the POL waste oil storage area where they are stored in either a 10,000 gallon mineral oil storage tank or a 5,000 gallon synthetic oil storage tank. The previous two tanks are grouped with a third - the previously described 10,000 gallon contaminated jet fuel tank within a fenced and earthen dike area. The waste oil tanks have been in service for approximately the past eight years. The waste oils are sold approximately once per year on a competitive bid basis and have been removed by a different private contractor in each case.

Two additional areas on the base collect waste oils which are not delivered to the POL waste oil storage tanks. These areas are the BX service station and the auto hobby shop. Waste oils at the service station are collected in a 500-gallon underground tank while oils at the hobby shop are collected in a 1,000-gallon underground storage tank. When either of these tanks has reached capacity, the manager will contact Pinewood Waste Oil Company of Pinewood, South Carolina to drain the tanks of the waste oils. The underground storage tank at the gas station facility has been in place since the facility was established,

while the tank at the auto hobby shop is only two years old. Prior to that time, oils were collected in 55-gallon drums and sold to a re-claimer.

Fuel and Oil Spills

Spills occurring on base are categorized as class I, class II, or class III spills, depending on the volume spilled and area covered. Class I spills are those which cover less than two feet in any planar direction; these are generally controlled by the agency responsible for the spill. Cleanup generally consists of applying sorbent material which is to be kept on hand by all potential spillers.

A class II spill is anything larger than a class I spill but not exceeding 10 feet in any planar direction, less than 50 square feet total coverage, and of a non-continuing nature. Immediate response by the local agency is to be followed by notification of the fire department who assists, if required, in any cleanup. Class III spills are any which exceed the definitions of a class II spill. These require full report to command authority off base and are therefore considered severe. Based upon records from the last year and discussions with fire department personnel, the average frequency of a class III spill is about once every five years.

The sorbent material which is used to clean up the majority of spills is called "oil sorbent" type 100, roll type, and is manufactured by 3M Company. It can be rolled out to cover small spills or it can be applied as a dike to prevent the spreading of spilled liquids. For hydraulic fluids and fuel oil spills, a material "speedi dry" is used. For class II and III spills, Civil Engineering has the responsibility for collecting the used sorbent material which is treated as a hazardous waste. It is drummed and moved to DPDO.

During the base survey, there were three previous class III spills and one reported visual observation which were noted. They were:

<u>Spill Area</u>	<u>Year</u>	<u>Amount JP-4 Spilled Gallons</u>
POL Bulk Fuel Storage	1963-67	10,000
Myrtle Beach Pipeline	1975	1,500
Flight Line (Bldg. 358)	1977	Unknown
Myrtle Beach Pipeline	1981	124,000

The POL area spill occurred between tank 41103 and a 50,000 gallon tank which used to be adjacent to it (See Figure 4.4 and Appendix A - page A-3). In 1975, a dragline struck and ruptured the 6 inch fuel supply line to the Myrtle Beach Bulk Storage Tank. The spill was contained and limited to 1200 square feet. No long term environmental damage was sighted.

In 1977 the S.C. Water Resources Commission was conducting a pump test adjacent to Building 358 (30 feet deep/10 gpm) and encountered POL contaminated ground water for the entire 24 hour test period. No correspondence was sent to the base informing them of this information. Subsequent review of underground storage tanks, etc. fails to explain the source of the contamination.

The last spill occurred in 1981 when 124,000 gallons of JP-4 was accidentally released by Myrtle Beach Pipeline Co (MBPC) near the Pipeline Bulk storage tank (See Figure 4.4 and Appendix A - page A-3) on leased land. French drains were installed by MBPC eleven days after the spill and they have recovered 24,000 gallons of fuel. The area of major contamination was 200 feet by 200 feet.

DESCRIPTION OF DISPOSAL METHODS

Waste Management Facilities

The on-site facilities which have been used for management of wastes can be categorized as follows:

- Landfills
- Gravity Separators
- Storm Sewer Systems
- Weathering Pits
- Septic Tanks

The types of waste management facilities are discussed individually in the following sub-sections.

Landfills

On-site landfills have been used for disposal of solid hazardous and non-hazardous wastes at MBAFB. Landfilling has been done at a total of five separate locations on the base. Figure 4.5 shows the five landfills which are located on the base property. Table 4.3 contains a summary of pertinent information concerning each landfill. Since 1974,

FIGURE 4.4

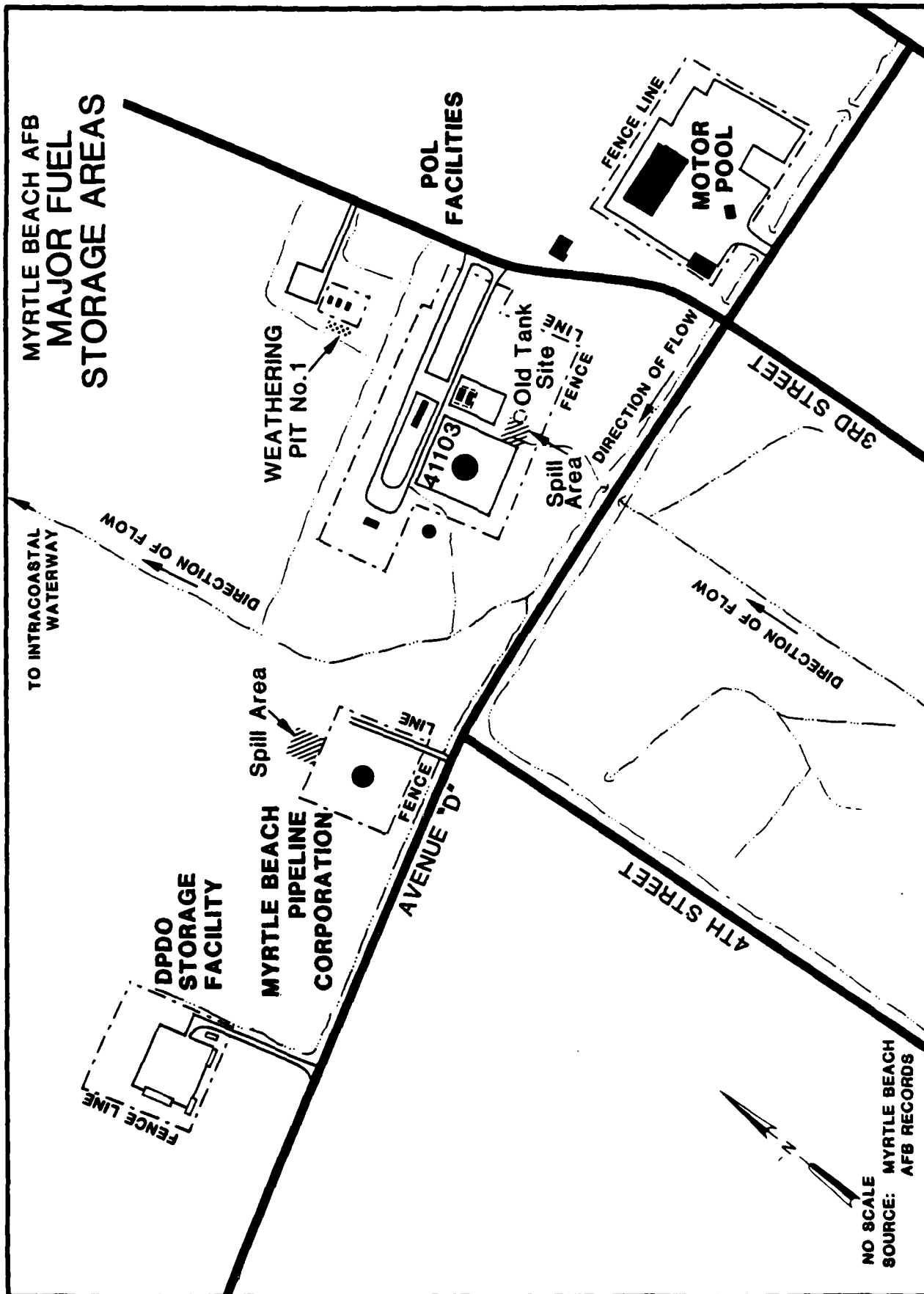


FIGURE 4.5

MYRTLE BEACH AFB LOCATION OF LANDFILLS AND WEATHERING PITS

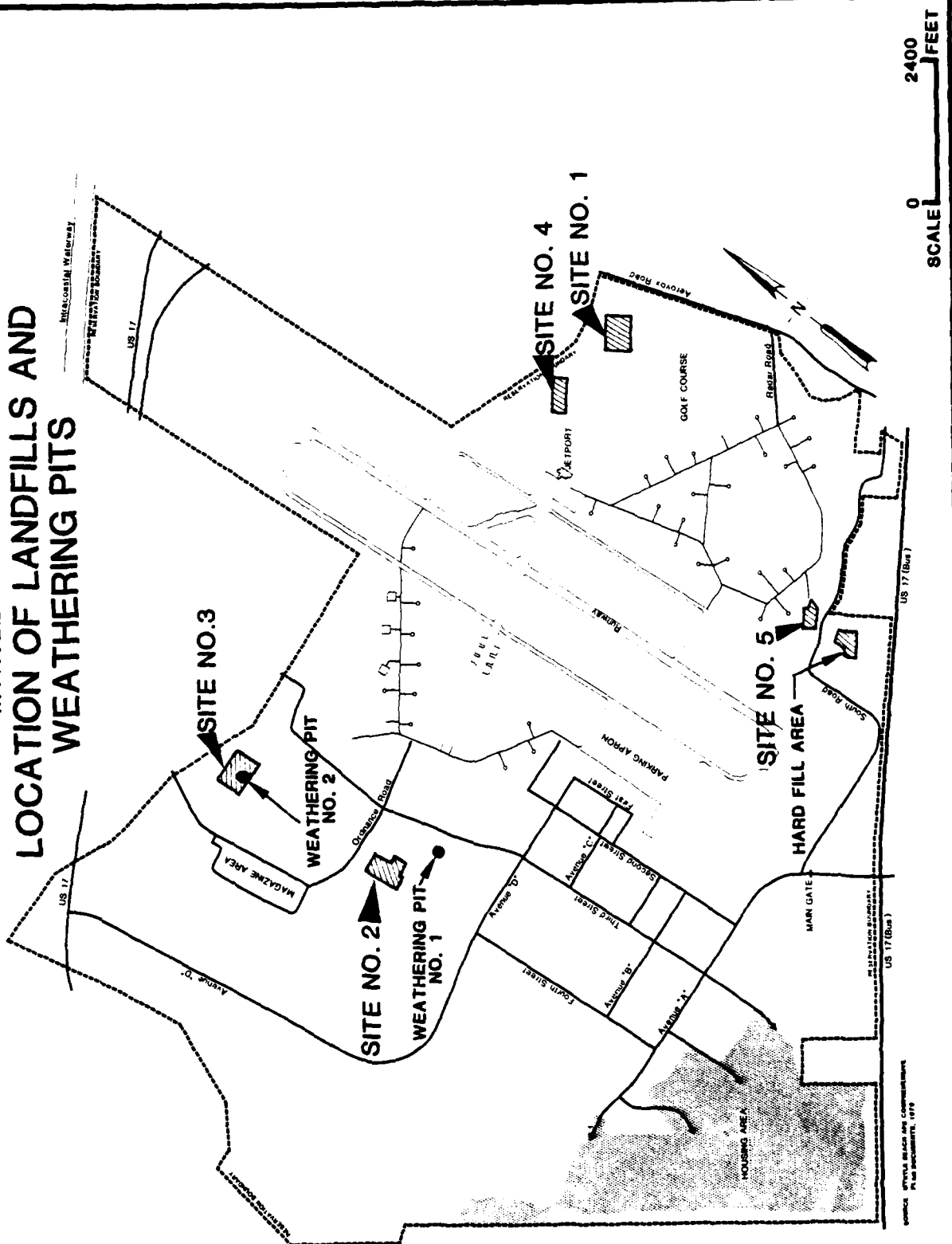


TABLE 4.3
LANDFILL INFORMATION SUMMARY

Landfill	Period Operation	Approximate Area Size (acre)	Types of Wastes Landfill	Estimated Quantity of Waste (cu. yd.)	Method of Operation	Closure Status	Geological Setting	Surface Drainage	Evident and Potential Problems
Number 1	1955-1960	9	general refuse	600,000	Trench and cover Daily burn	Inactive- Site of golf course	Fine to medium sand	Drainage ditch to Atlantic via stream	• permeable soils
Number 2	1960-1964	6	general refuse	500,000	Trench and cover Daily burn	Inactive with cover applied; partially vegetated	Silty fine to medium sand	Drainage ditch to Intracoastal Waterway	• permeable soils • hard fill area
Number 3	1964-1968	12.0	general refuse	500,000	Trench and cover	Inactive with cover applied; partial plant cover; active weathering pit on surface	Silty fine sand	Drainage ditch to Intracoastal Waterway	• permeable soils • surface leachate flow • some ponding • hard fill area
Number 4	1968-1972	9	general refuse	500,000	Trench and cover	Inactive with cover applied; re-vegetated	Fine to medium sand	Drainage ditch to Atlantic via stream	• permeable soils
Number 5	1972-1974	6	general refuse	250,000	Trench and cover	Inactive with cover applied; no plant cover	Fine to coarse sand	Drainage ditch to Atlantic Ocean	• highly permeable soils • hard fill area

all municipal solid waste generated on base has been hauled off base by a private contractor.

Landfill No. 1 is situated in the northeastern portion of the Myrtle Beach property, encompassing approximately 9 acres as shown in Figure 4.6. The previous Figure shows the approximate site boundaries of the landfill and the configuration of the individual cells. The landfill began operation in 1955 and was closed in 1960.

All landfilling was accomplished by a trench burning and cover operation. The trenches would be burned every other day and after the fire burned out, the trench would be covered on the succeeding day. Trenches were normally constructed approximately 16 feet in width and an average 5 to 10 feet deep at this particular location because of its relatively high elevation. Ordinarily on hitting the ground water table, a trench would be cut no deeper since it would interfere with the overall landfilling operation. After the landfill was closed, the base golf course was constructed over Landfill No. 1.

Landfill No. 2 is situated in the northwest section of the base northwest of the POL area. The boundary of this 6 acre site is shown in Figure 4.7. The trench orientation was generally east to west with the western side of the landfill abutting the major drainage ditch which drains a major portion of the Myrtle Beach Air Force property. The southern portion of the site has currently been cleared of vegetation and is being utilized by outside contractors to park vans and for equipment storage. The eastern portion of the site is being utilized as a hardfill area (construction debris). The problem with this procedure is that depositing hardfill on top of the closed landfill disturbs the surface drainage pattern and can cause ponding of stormwater with the increased potential for leachate development.

Based on our interviews, it was determined that on occasion barrels of water oil and solvents were placed in this landfill during its operation (1960-1964). This landfill, like Landfill No. 1, was operated as a burn and cover operation. It is reasonable to assume that most, if not all, of the chemicals and oils which have been placed in the trenches would have been destroyed during the burning operation.

Landfill No. 3 is located at the northeast corner of the base property as shown in Figure 4.8. The landfill was in operation from

FIGURE 4.6

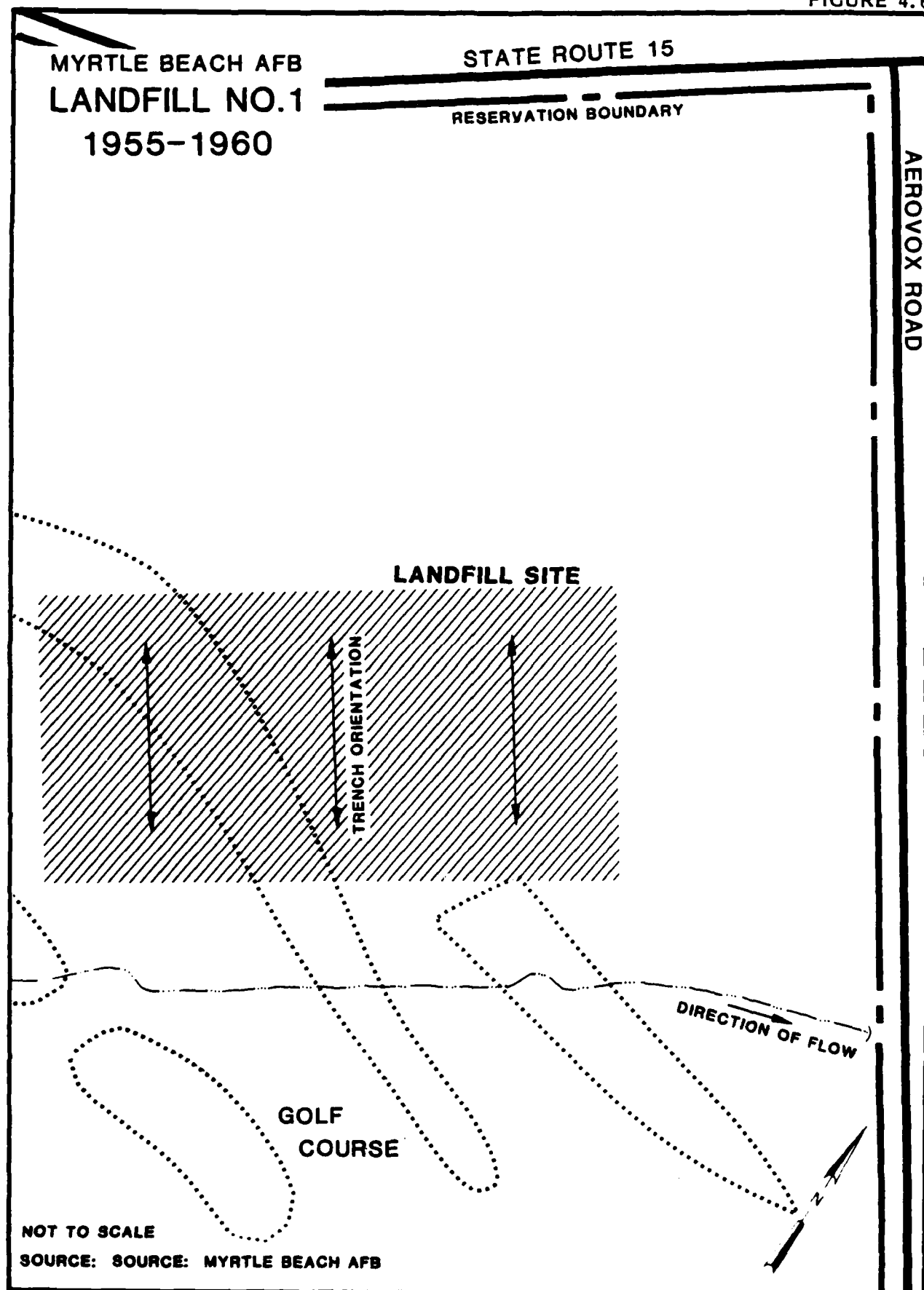


FIGURE 4.7

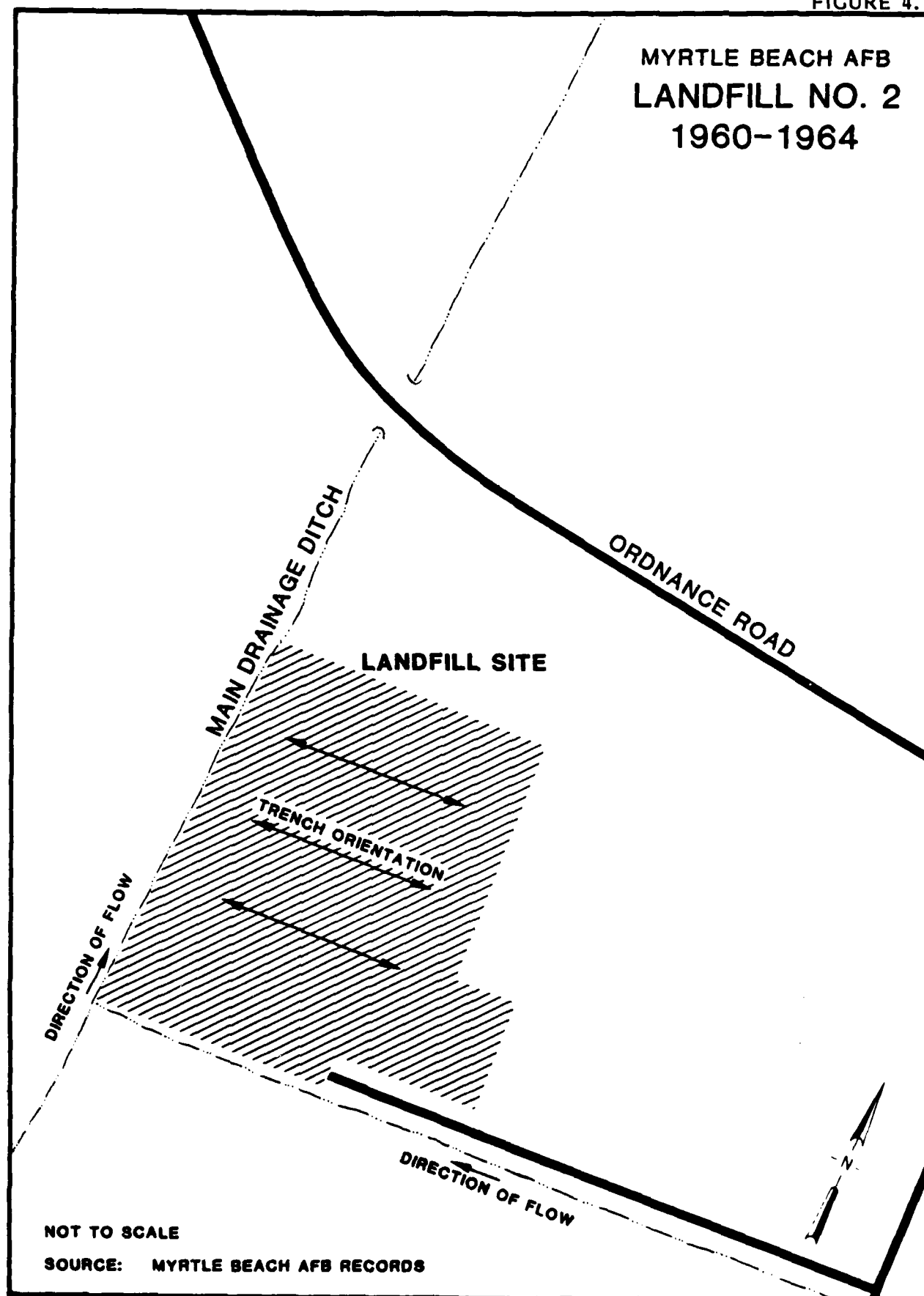
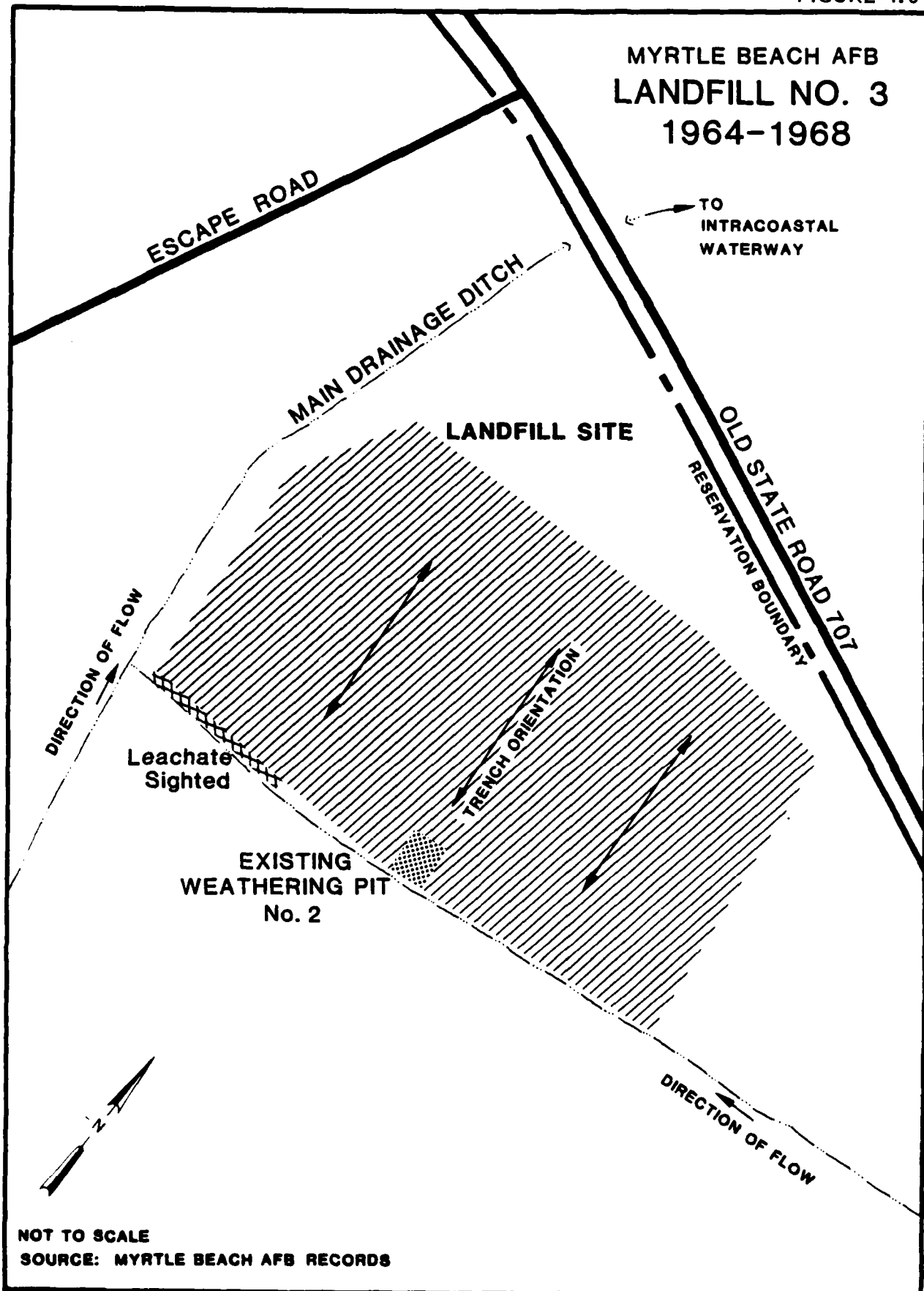


FIGURE 4.8



1964 to 1968. The site was approximately 12 acres and was constructed with the trenches running from north to south.

During the period of operation of Landfill No. 3, air pollution regulations at Myrtle Beach prevented the daily burning of solid waste. Therefore, Landfill No. 3 was the first landfill to be operated as a trench and cover operation with no burning. Any materials that found their way into the landfill would not have been destroyed and could possibly provide a source of potential future groundwater contamination.

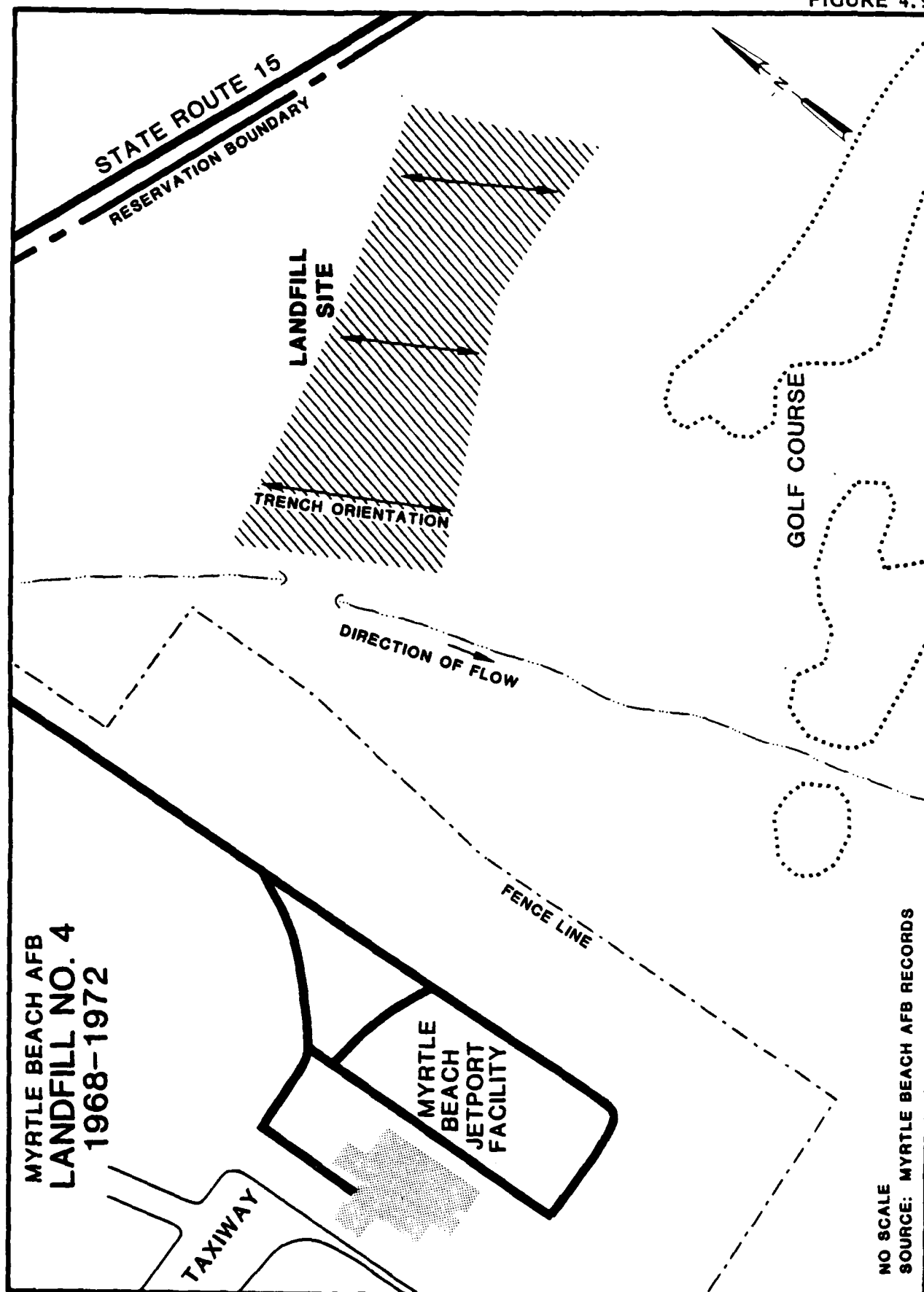
After the landfill operation was closed in 1968, the base obtained permission from the State in 1976 to landfill grease and scum from their anaerobic digesters in trenches which were constructed perpendicular (east to west) to the existing landfill trenches. The trenches were constructed approximately 3 feet deep with 18 inches of material from the digesters being placed in them. After dewatering, the trenches were closed and the site regraded.

Landfill No. 3 is also important since it is the site of Weathering Pit No. 2 which will be discussed in more detail in the following section.

Landfill No. 3 has been graded so that the surface runoff drains in either a southerly or westerly direction to ditches which abut the site. During wet weather periods, leachate has been observed as shown on Figure 4.8 entering the adjacent drainage ditch. During our site visit, it was an extremely dry period, and no leachate was observed. Visual observations made at the site indicate differential settlement and the need for regrading sections of the site to prevent the ponding of stormwater. Other portions of the site have been used as hardfill areas and for the disposal of sludge from the wastewater treatment plant drying beds. All of these materials have been placed in piles on the surface of the landfill and no attempt at regrading has been undertaken. These piles of material will disrupt established drainage patterns and increase the likelihood of additional leachate generation (See Appendix A page A-4).

Landfill No. 4 is shown on Figure 4.9 and was utilized from 1968 to 1972. The landfill was constructed on top of an area which served as a sand borrow pit. The trench orientation was generally north to south. Of the five landfills previously used, Landfill No. 4, because of its

FIGURE 4.9



remote location, has not been utilized as a hardfill area and as such is completely vegetated with growth 12 to 24 inches high.

Landfill No. 5 was operated from 1972 to 1974 when the base abandoned on-site disposal of solid waste. The site for Landfill No. 5 is located in Figure 4.10. The site encompasses 6 acres on the south-east portion of the base property. Trench orientation is generally east to west with only three trenches being utilized before the site was closed and all solid waste transported off base. After the site was closed, it has been used to receive various amounts of refuse which includes pavement, tree limbs, miscellaneous metals and various other spoil materials. Based on visual observations, surface water on the site will be channeled into the landfill based upon the amount of the refuse which has been piled on the surface and which will preclude surface runoff.

Conversations with base engineering personnel indicate that at the present time all outside contractors are required to haul all construction debris off the base.

Beside the above five landfill sites, there is a designated hardfill or trash site immediately southeast of Landfill No. 5. The site encompasses 8 acres and has received varying amounts of construction debris deposited in piles throughout the site. Visual observations indicated no obvious hazardous waste which would be of concern and create possible contamination of groundwater.

Storm Sewer System

The Myrtle Beach AFB is divided into two major drainage basins with the divide running approximately in a north-south direction down the middle of the base property. All precipitation falling on the eastern portion of the property generally flows in a easterly direction toward the Atlantic Ocean, while waters falling on the western portion of the base flow toward the Intracoastal Waterway. These general drainage patterns are shown on Figure 4.11.

Storm sewers are utilized only in the heavily developed residential areas and areas adjacent to the flight line where the use of drainage ditches is impractical. It is estimated that over 90 percent of the base area is drained by surface ditches. All ditches within view of the major roads on the base are deepened and cleaned of sediment at least

FIGURE 4.10

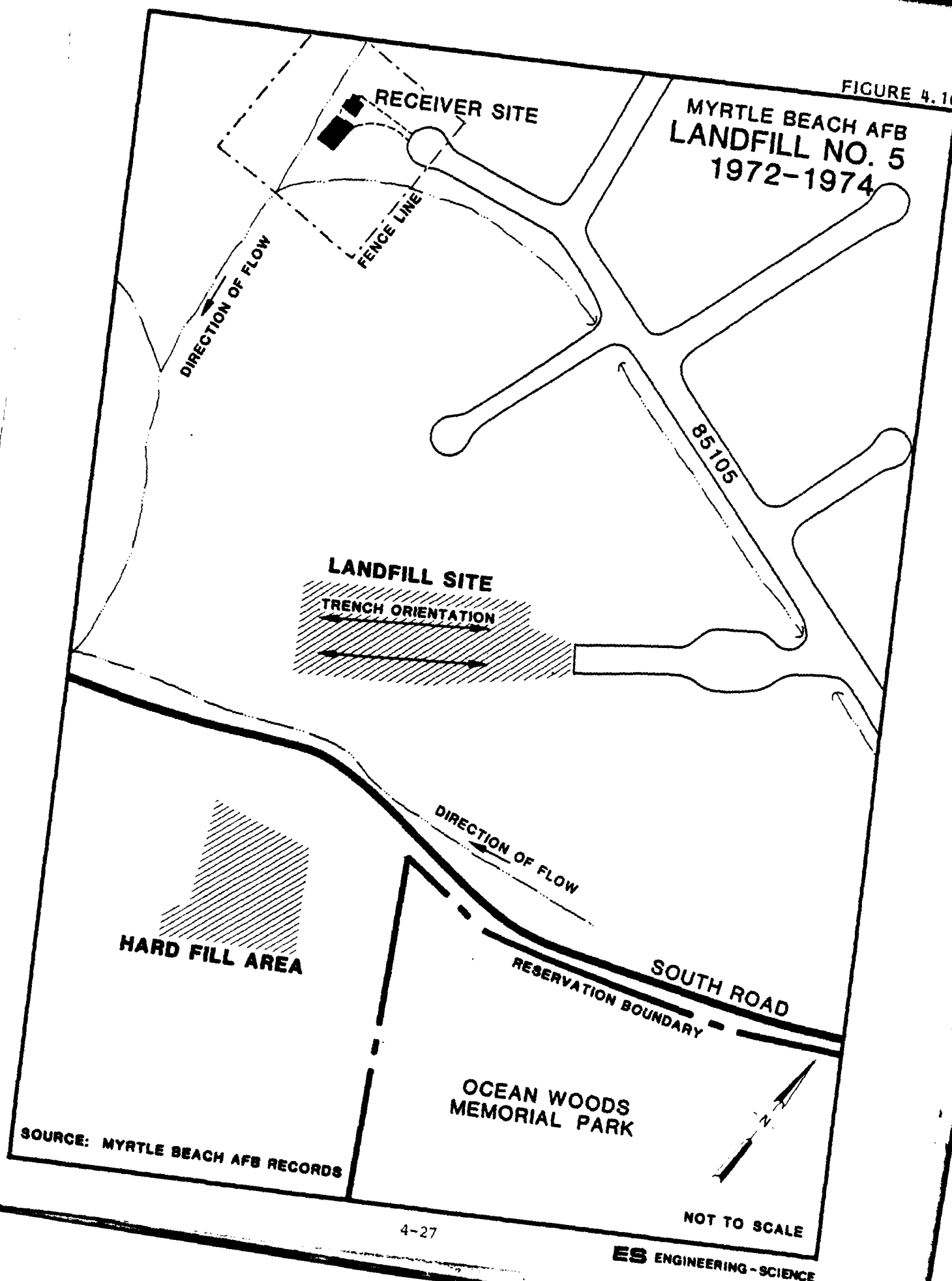
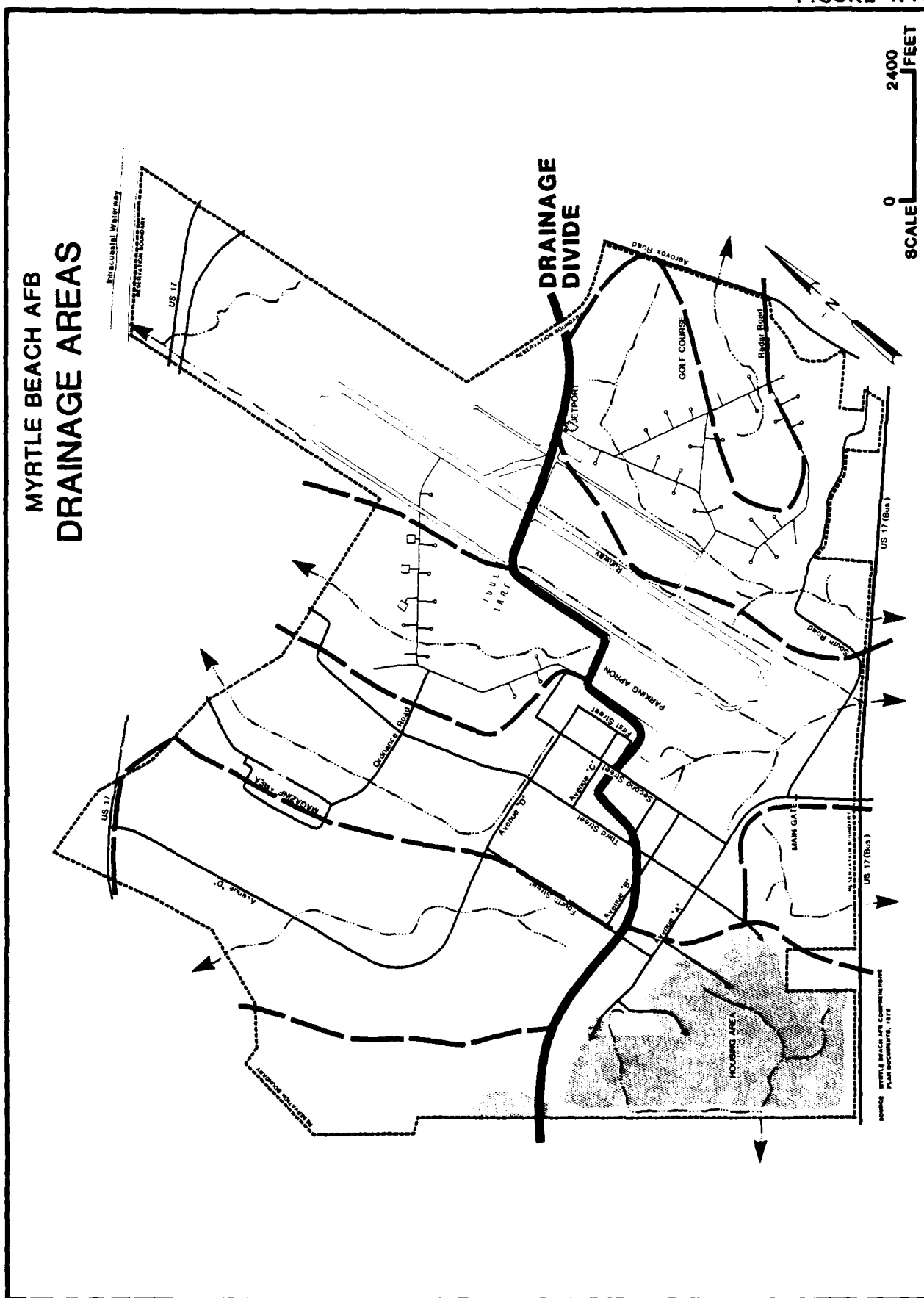


FIGURE 4.11



once a year. The ditches themselves are approximately 5 to 10 feet deep and generally contain small amounts of standing water in the bottom portion which is an indication of the ground water table.

Over the years, there has been a concerted effort on the part of the base personnel to eliminate the discharge of contaminated wastewaters to the existing drainage system. As potential discharges were located, specific construction projects were completed to remove these discharges from the drainage ditches. From a historical viewpoint, these ditches have received various quantities of fuel oil and other miscellaneous chemical spills and discharges. However, under the current surface water sampling program, oil and grease (O&G) and total suspended solids data are collected on a quarterly basis. The data indicate that residual O&G in the ditches are not a problem. Also, if there had been any accumulation of O&G in ditches this has been removed with the extensive maintenance program which is undertaken on the base.

From conversations with base personnel, oil booms are used extensively on the major ditches discharging to the Atlantic Ocean and the Intracoastal Waterway to intercept any oil spills which may pass existing oil-water separators. This practice has been followed for approximately the past 3 to 5 years.

Oil- Water Separators

At the present time, there are 24 oil-water separators located on the Myrtle Beach property. These separators handle run off from various shops, wash racks, fire training area and the flight line. In 1955 when the base was reactivated, there were eight oil-water separators which were being utilized at that time. Based on conversations with base personnel, it was felt that its location near the ocean and the high visibility of the base with respect to the recreational activities along the beach required that the base be particularly aware of oil discharges.

At the present time, the oil-water separators are maintained using a vacuum tank truck. All of the separator volume is removed and discharged to a separator upstream of the wastewater treatment plant. Sludge from this separator goes to the weathering pit while floating oil is recovered and sold through DPDO.

Weathering Pits

Air Force bases handling large quantities of jet fuel have one unique disposal problem which they have addressed utilizing a weathering pit. Large quantities of jet fuel are filtered and the filters themselves when approaching high pressure drop are removed and placed in a weathering pit, which is a shallow dry pit which contains the filters and allows evaporation of the fuel from the filter material. Once the filter is dried out, it is disposed of in a sanitary landfill. In addition to filters, booms are also placed in weathering pits to dry out before disposal. The use of weathering pits on Air Force bases provides a historic problem since they are also a candidate for the indiscriminate disposal of liquid wastes. This has also been the case at Myrtle Beach.

Based on conversations with base personnel, there have been two weathering pits which have been utilized on the base. These are shown on Figures 4.5, 4.4 and 4.8. The current weathering pit is located at Landfill No. 3 (See Appendix A, page A-4), while the older weathering pit is located adjacent to the waste oils area. The following is a summary of physical information with regard to the two pits:

<u>Pit No.</u>	<u>Use</u> <u>Period</u>	<u>Dimensions</u>	<u>Liquid</u> <u>Depth</u>
1	1973-78	15' x 15'	12"
2	1979-81	50' x 55'	12"

Based on conversations with base personnel, both weathering pits have received quantities of waste oils, solvents and paint strippers. The existing weathering pit has been cited by the South Carolina Department of Health and Environmental Control when they conducted their recent RCRA inspection. The former weathering pit has since been closed and the site regraded. At the time of this on-site visit, a slight difference in the coloration of the surface grasses was noted only after the pit area had been outlined by base personnel. There are no obvious physical remnants of the former weathering pit.

The concept of the weathering pit has some basic problems from an environmental standpoint. Since the pit is uncovered, it allows precipitation to mix with small quantities of fuel and to possibly enter the ground water table.

Septic Tanks

There are over 12 septic tanks on base serving facilities which are located too far from existing sanitary sewer lines to economically justify a sewer service connection. Based on the on-site survey, however, these units have been used primarily for the disposal of sanitary sewage and should not pose a hazard from the standpoint of possible ground water contamination.

Off Site Disposal Facilities

The methods used for disposal of MBAFB hazardous and non-hazardous wastes include:

- Off site waste oil contract disposal
- Off site refuse contract disposal
- Off site waste chemical contract disposal

Waste Oil Disposal

Waste oil, waste fuels and hydraulic fluids which are resalable are marketed through DPDO in Charleston on a competitive bid basis. The base service station and the hobby shop utilize Pinewood Waste Oil a division of SCA Services in Pinewood, S.C., to remove their waste oil and incinerate it. This contract has been in affect since 1975.

Refuse Disposal

Residential solid waste was placed in landfills on the base from 1959-1965. From 1966-1974, residential refuse was disposed off site by Refuse Container Corporation. In 1974, all refuse was hauled off base by a contractor and the landfills were closed. Mideast Services of Dunn, North Carolina presently has the annual contract to dispose of wastes in the Horry County landfill near Conway. This contract is administered by the Base Contracting Office.

Waste Chemical Disposal

In accordance with DEQPPM No. 80-5, Department of Defense has the responsibility of disposing of eight categories of hazardous materials (See Appendix G) which are handled through the Base Contracting Office by using a one time contract with a waste management firm. Other

hazardous materials are disposed of by DPDO in Charleston in accordance with DEQPPM No. 80-5 and 80-8 (See Appendix G).

EVALUATION OF PAST WASTE DISPOSAL FACILITIES

Fifteen disposal sites associated with MBAFB were identified as containing hazardous material resulting from past waste disposal activities. These sites have been assessed using a rating system which takes into account factors such as site characteristics, waste characteristics, potential for contamination and waste management practices. The details of the rating procedure are presented in Appendix H and the results of the assessment are summarized in Table 4.4. Rating scores were developed for the individual sites and the sites are listed in order of ranking. The rating system is designed to indicate the relative need for more detailed site assessment and/or remedial action. The information presented in Table 4.4 should be used as a guide for assigning priorities for dealing with the MBAFB disposal sites. The rating forms for the individual waste disposal sites are presented in Appendix E for review.

In addition to the rating information in Table 4.4, the period of operation is also presented. It should be pointed out that the rating system does not take into consideration a "time factor." This is especially pertinent when considering spills, fire training areas and weathering pits.

In Table 4.4, weathering pit No. 2, which is currently used, received the highest score of 79. The other weathering pit received a score of 68 because it was closed and no visual contamination was apparent. Two major fuel spills and the fuel contaminated area near the flight line (Bldg. 358) also ranked very high. This is because of the base's shallow water table, sandy soils and the water table aquifer supplies low fluoride drinking water to the base.

The fire training areas also ranked high because of the large amount of waste chemicals added to the sandy soil before it would become saturated and support combustion. In addition 50 gallons of fire retardent chemical were applied for each fire. The COD of this chemical is equivalent to 166 lbs per training exercise. Fire Training Area No. 3 has been reforested with southern pine and no visual evidence of

TABLE 4.4

PRIORITY RANKING OF POTENTIAL CONTAMINATION SOURCES
MYRTLE BEACH AFB

RANK	SITE NAME	PERIOD OF OPERATION	RECEPTOR SUBSCORE	PATHWAYS SUBSCORE	WASTE CHARACTERISTICS SUBSCORE	WASTE MANAGEMENT SUBSCORE	OVERALL SCORE	REFER TO APPENDIX I PAGE NO.
1	Weathering Pit #2	1979-1981	88	81	100	51	82	I-19
2	Myrtle Beach Pipeline Corp.	1981	79	85	100	46	78	I-21
3	POL Bulk Fuel Storage Area	1963-1967	87	67	70	72	73	I-25
4	Flightline Contaminated Area	1977	85	77	80	51	73	I-23
5	Landfill #3		88	63	60	67	68	I-5
6	Fire Training Area #1 and #2	1955-1964	80	35	100	61	68	I-11
7	Weathering Pit #1	1973-1978	86	44	100	49	68	I-17
8	Fire Training Area #3	1965-1969	83	31	100	56	64	I-13
9	Landfill #4	1968-1972	86	41	60	62	60	I-7
10	Underground Waste Chemical Storage	1978-Present	82	36	50	52	54	I-27
11	Landfill #1	1955-1960	86	41	30	62	53	I-1
12	Landfill #2	1960-1964	62	45	30	67	51	I-3
13	Landfill #5	1973-1974	59	43	50	55	51	I-9
14	Radioactive Vault	1959	91	31	10	17	35	I-29
15	Fire Training Area #4	1970-1981	28	31	30	45	33	I-15

NOTE: This ranking was performed according to the Hazard Evaluation Methodology described in Appendix H.

contamination exists. The establishment of trees indicates that residual chemicals have not prevented root growth or nutrient and water uptake which are necessary for tree growth. The sandy soil would be conducive to flushing of chemicals into the ground water leaving minimal residual in the soil.

Landfill No. 3 ranks higher than Landfill No. 4 because leachate has been observed during wet weather conditions. Landfill No. 1 and No. 2 were operated as burn and cover operations so that most flammable chemicals would have been destroyed. Landfill No. 5 did not receive as much hazardous waste since the environmental awareness of the base was increasing significantly during this operating period.

Information from Fort Fisher AFS was evaluated and no areas were found to present a potential for ground water contamination.

CHAPTER 5
CONCLUSIONS

CHAPTER 5

CONCLUSIONS

The goal of Phase I of the IRP was to identify the potential for environmental contamination from past waste disposal practices and spill incidents at Myrtle Beach AFB and to assess the probability of contamination migrating beyond the base boundaries. Based on the results of the project team's one week field inspection, review of records and files, and interviews with base personnel, past employees and state and local government employees, the following rankings have been developed. Table 5.1 contains the priority ranking of potential contamination sources at Myrtle Beach AFB. The following conclusions are listed by category.

1. Weathering Pits

- a.) Weathering Pit No. 2 has the greatest potential for off-site migration of contaminants and has received a score of 82. Unauthorized dumping of oils, solvents and paint strippers has created a potential contamination problem. This situation is compounded by the site's sandy soil and shallow ground water table.
- b.) Weathering Pit No. 1 received a score of 68 because it was closed and no visual contamination was apparent.

2. Spill Areas

- a.) The major JP-4 spill adjacent to the Myrtle Beach Pipeline bulk storage tank received a score of 78. To date 24,000 of the 124,000 gallons of fuel have been recovered.
- b.) Two other areas which were ranked with a lower score were the POL spill area (73) and the Flight Line contaminated area (adjacent to Building 358 - Score 73). Although the POL fuel spill occurred over 15 years ago, it would seem there may be residual fuel contamination on the base. This was reinforced when the State's pump test adjacent to Building 358 found fuel in the ground water during a 24 hour pump test in 1977.

FIGURE 5.1
SUMMARY RANKING OF POTENTIAL
CONTAMINATION SOURCES

Rank	Site Name	Period of Operation	Score
1	Weathering Pit #2	1979-1981	82
2	Myrtle Beach Pipeline Corp.	1981*	78
3	POL Bulk Fuel Storage Area	1963-1967*	73
4	Flight line Conta- minated Area	1977*	73
5	Landfill #3		68
6	Fire Training Areas #1 & #2	1955-1964	68
7	Weathering Pit #1	1973-1978	68
8	Fire Training Area #3	1965-1969	64
9	Landfill #4	1968-1972	60
10	Underground Waste Chemical Storage	1978-present	54
11	Landfill #1	1955-1960	53
12	Landfill #2	1960-1964	51
13	Landfill #5	1973-1974	51
14	Radioactive Vault	1959	35
15	Fire Training Area #4	1970-1981	33

* Spill or date of observation

3. Landfills

- a.) Landfill No. 3 ranks higher (score 68) than Landfill No. 4 (score 60) because leachate has been observed during wet weather conditions. This landfill is ranked lower than the weathering pit and spill areas because liquid wastes were not placed directly into the landfill trenches and the quantity of wastes handled was much less.
- b.) Landfill No. 1 and No. 2 were operated as burn and cover operations so that most flammable chemicals would have been destroyed. They received respective scores of 53 and 51.

4. Fire Training Areas

- a.) Fire Training Areas No. 1 and No. 2 ranked high (score 68) because of the large amount of waste chemicals added to the sandy soil before it would become saturated and support combustion.
- b.) Fire Training Area No. 3 has been reforested with southern pine and no visual evidence of contamination exists. The establishment of trees indicates that residual chemicals have not prevented root growth. The sandy soil would be conducive to flushing of chemicals into the ground water leaving minimal residual in the soil.

CHAPTER 6
RECOMMENDATIONS

CHAPTER 6

RECOMMENDATIONS

In order to aid in the comparison of these fifteen sites with those sites identified in the IRP at other Air Force Bases, a priority ranking scale has been developed. Those sites with overall scores of 65 to 100 are in the First Priority category and are sites of primary concern, based on their potential for waste migration off-site. They require further investigation in Phase II. Sites of secondary concern fall into Second Priority, with scores from 60 to 65. Further investigation for these sites is recommended. Third Priority sites (scores from 0 to 59) are other sites with a low potential for contamination and no further monitoring is recommended unless data collected from other higher priority sites indicates a problem.

The following recommendations are made to further assess or prevent potential contaminant migration from waste disposal areas at Myrtle Beach AFB.

RECOMMENDATIONS FOR PHASE II

First Priority

- 1.) Ground water contamination by petroleum products has been documented at three (3) separate locations on Myrtle Beach Air Force Base. They are the Myrtle Beach Pipeline Corporation, POL Bulk Fuel Storage Area and Flight line contaminated area. The first two spills directly affected an area of one acre each. The extent of the latter observation was unknown. The extent of the current contamination are not presently known. In order to make a preliminary determination of the severity and extent of contamination, it is recommended that surface geophysical methods (electromagnetic conductivity, ground penetrating radar or electrical resistivity) be employed to map subsurface zones degraded by POL contamination. Such methods have been demonstrated to be successful in Coastal Plain environments, and provide useful data at reasonable cost when compared to drilling programs yielding the same depth of

detail and generally improve study confidence levels.

- 2.) It is recommended that a ground water monitoring program be established at each site to determine whether there is any contamination from Weathering Pit No. 1 and No. 2, the Fire Training Areas No. 1 and No. 2, and Landfill No. 3. Such a system should consist of at least one monitoring well located hydraulically up-gradient of the site, and three monitoring wells located hydraulically down-gradient of the site. At this time, it is believed that wells comprising such a system will have a total depth on the order of thirty (30) feet. The actual design of a ground water quality monitoring system must be predicated upon site-specific hydrogeologic data. At a minimum, the following parameters should be monitored: nitrate, chloride, iron, manganese, phenol, sodium, sulfate, pH, specific conductance, total organic halogen and total organic carbon. Grab samples should also be collected from the drainage ditch adjacent to Landfill No. 3 to characterize leachate during the wet season.

Second Priority

- 1.) It is recommended that ground water and surface water sampling be performed for Fire Training Area No. 3 and Landfill No. 4, with similar analyses being carried out as recommended above. The second priority sites should not be undertaken unless the analytical data from the first priority sites indicate a contamination problem.

Other Recommendations

- 1.) Obtain a water sample from the low fluoride well and run an organic pollutant scan on the GC/MS. Organic parameters from EPA's priority pollutant list should be measured.

APPENDICES

APPENDIX A
PHOTOGRAPHS

AD-A119 028

ENGINEERING-SCIENCE INC ATLANTA GA
INSTALLATION RESTORATION PROGRAM. PHASE 1. RECORDS SEARCH. HAZA--ETC(U)
OCT 81

F/G 13/2

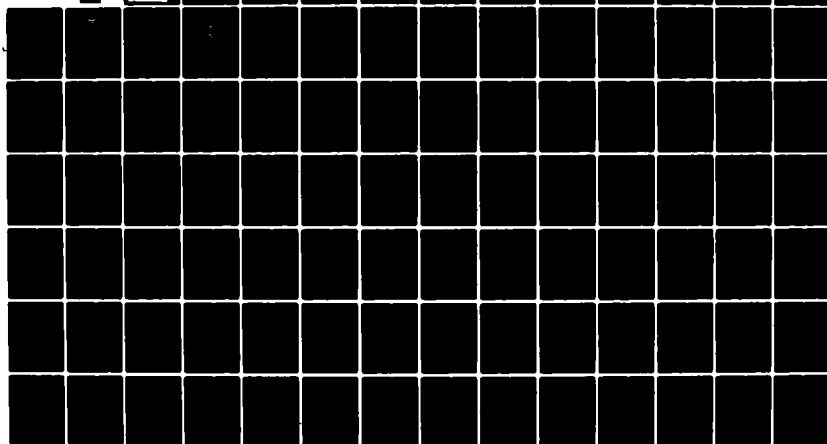
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2 of 3

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MYRTLE BEACH AFB

December, 1954



Fuel Spill Areas



MYRTLE BEACH PIPELINE CO. SPILL AREA



POL BULK FUEL STORAGE AREA SPILL

Landfill And Weathering Pit



LANDFILL NO. 3



WEATHERING PIT NO. 2

APPENDIX B
ANNEX DESCRIPTION
FORT FISHER AIR FORCE STATION
KURE BEACH, N.C.

APPENDIX B

FORT FISHER AIR FORCE STATION KURE BEACH, NORTH CAROLINA INSTALLATION HISTORY

Fort Fisher AFS is located 20 miles south of Wilmington, North Carolina on a peninsula. The station property is bounded on the east by the Atlantic Ocean and on the west by the Cape Fear River. The station itself comprises an area of 25 acres of which an additional 212 acres are leased from the Army as a clearance zone for the station's radar. Fort Fisher AFS at the present time has a complement of 140 personnel presently assigned. The only active shop is a civil engineering grounds and maintenance building.

The site was closed by the Army in 1945 and then reopened by the Air Force in August 1955. This coincided with the reactivation of the Myrtle Beach Air Force Base.

POL Area

Fort Fisher AFS has only one underground fuel oil storage tank which is utilized for leaded mogas and which is 1,000 gallons in volume. At the Fort, is a standby diesel power plant. Associated with this operation is a fuel storage area which is diked and which has no record of spills.

There are no vehicle maintenance activities undertaken at Fort Fisher AFS. All GSA vehicles are maintained in Raleigh, North Carolina while U.S. Air Force vehicles are maintained at Myrtle Beach AFB.

Waste Disposal

All solid waste generated at the Fort is disposed of off site by Trash Removal Service Wilmington, North Carolina. Historically there has been no on-site disposal of solid wastes in the past. Wastes, oils, fuels and other miscellaneous materials are shipped to Myrtle Beach for disposal. No on-site disposal of any chemicals was noted.

Utilities

Water supply for the Fort is furnished by two deep wells located on the station property. All wastewater is currently treated in an existing package plant and discharged to the Cape Fear River. By December 1981, the Fort is scheduled to be incorporated into a regional

wastewater system thereby eliminating their effluent discharge. There are no wash racks at the Fort and therefore no oil-water separators to be maintained. There are three septic tanks on the station property and these have received only domestic wastewaters and should not pose any potential contamination to the groundwater.

Pesticides/Herbicides

All entomology activities are handled under a service contract. This has been true since the mid 60's. At that time all entomology activities had been handled by the Fort personnel. Since the Fort itself is relatively small, it is envisioned that the disposal of pesticide and herbicide containers could not pose a serious environmental threat.

Radioactive Wastes

Any radio tubes in the past which have had a low radioactivity level were disposed of through DPDO facilities and have not been stored permanently on the station's property.

APPENDIX C
MISCELLANEOUS DATA

TABLE C.1

MYRTLE BEACH AIR FORCE BASE CLIMATIC DATA

(Period of Record 1942-1947 and 1949-1981)

# LESS THAN 0.5%	TEMPERATURE (°F)						PRECIPITATION (IN)				WIND (KTS)		
	EXTREME MAXIMUM	MEAN MAXIMUM	MEAN MINIMUM	EXTREME MINIMUM	04001ST RELATIVE HUMIDITY (%)	13001ST	MEAN TOTAL	MAX IN 24 HOURS	# DAYS PRECIPITATION	# DAYS THUNDERSTORMS	PREVAILING DIRECTION	MEAN SPEED	EXTREME SPEED (PEAK GUST)
JAN	81	58	37	16	85	62	2.8	2.7	9	1	N	6	47
FEB	83	59	38	09	82	60	3.6	2.9	9	1	NNE	7	90
MAR	88	63	44	19	85	59	4.8	3.4	11	2	SSW	7	46
APR	93	71	52	28	87	59	2.9	3.0	8	3	SSW	7	41
MAY	98	79	61	36	91	63	2.8	2.7	8	6	S	6	51
JUN	104	85	68	48	92	67	5.7	6.3	9	9	SSW	6	38
JUL	101	87	71	54	93	70	6.7	6.3	13	12	SSW	6	45
AUG	104	86	70	54	93	68	5.6	4.8	10	10	S	6	35
SEP	99	82	66	42	92	67	6.8	6.9	9	5	NNE	6	56
OCT	93	75	54	25	90	60	2.8	8.2	6	1	NNE	5	36
NOV	83	66	43	16	87	56	2.4	2.8	7	1	N	5	40
DEC	81	57	36	11	83	59	2.9	3.1	8	1	N	5	47
ANNUAL	92	72	53	30	88	62	49.8	-	107	52	-	6	-

SOURCE: Detachment 3, 3rd Weather Wing, MBAFB.

TABLE C.2

CHEMICAL ANALYSIS OF WATER FROM THE
WATER-TABLE AQUIFER*
GRAND STRAND, SOUTH CAROLINA

<u>Parameter</u>	<u>mg/liter</u>
Silica (SiO ₂)	13
Iron (Fe)	2.7
Calcium (Ca)	30
Magnesium (Mg)	1.6
Sodium (Na)	12
Potassium (K)	0.4
Bicarbonate (HCO ₃)	93
Sulfate (SO ₄)	2
Chloride (Cl)	20
Fluoride (F)	0.1
Dissolved solids (residue at 180°C)	132
Specific conductance (micromhos/cm at 25°C)	218
pH	7.0

* Taken from the 32 foot low fluoride well at the
Myrtle Beach Air Force Base.

SOURCE: Draft Environmental Impact Statement Grand
Strand Region, South Carolina; EPA (1977);
page 2-21.

TABLE C.3
UNDERGROUND FUEL STORAGE TANKS

<u>PRODUCT STORED</u>	<u>FACILITY NO.</u>	<u>TANK CAPACITY</u> gallons
#2 Fuel Oil	101	250
#2 Fuel Oil	256	2,000
#2 Fuel Oil	324	2,000
#2 Fuel Oil	341	2,000
#2 Fuel Oil	364	3,000
#2 Fuel Oil	368	500
#2 Fuel Oil	405	500
#2 Fuel Oil	406	500
#2 Fuel Oil	512	550
#2 Fuel Oil	965	2,000
#2 Fuel Oil	965	3,000
#2 Fuel Oil	965	2,000
#2 Fuel Oil	965	1,000
#2 Fuel Oil	1286	1,000
#5 Fuel Oil	114	20,000
#5 Fuel Oil	250	25,000
#5 Fuel Oil	352	12,000
#5 Fuel Oil	358	10,000
#5 Fuel Oil	359	10,000
Mogas	357	550
Mogas	410	500
Mogas	122	180
Mogas	960	150
Mogas	1280	150
Mogas	517	150
Mogas	220	500
Mogas	103	150

TABLE C.3 (CONT.)
UNDERGROUND FUEL STORAGE TANKS

<u>PRODUCT STORED</u>	<u>FACILITY NO.</u>	<u>TANK CAPACITY</u>
		gallon
Mogas	200	4 each 10,000
Mogas	41101	25,000
Mogas	Motor Pool	3 each 5,000
Mogas	320	1,000
Diesel	41101	25,000
Diesel	Motor Pool	5,000
LP	326	250
JP-4	320	2,000

APPENDIX D
STATE WATER RESOURCES
COMMISSION CORRESPONDENCE

State of South Carolina
Water Resources Commission



Clair P. Guess, Jr.
Executive Director

August 14, 1981

Mr. Mark Spiegel
Engineering Science, Inc.
57 Executive Park S.
Suite 590
Atlanta, Georgia 30329

Dear Mr. Spiegel:

This letter is in response to your phone request for the locations and the depths of all wells near the Myrtle Beach Air Force Base.

Enclosed please find a well tabulation sheet containing information about Class A (requiring ground-water use permit) public supply wells in the immediate vicinity of the Myrtle Beach Air Force Base, and their locations on a county road map. We do not have an inventory of private, domestic wells.

Local development within the City of Myrtle Beach has increased demand for water from the Black Creek Aquifer System. This pumpage has created a general decline of the ground-water level throughout the aquifer system in the immediate vicinity. The closest water level observation well (SCWRC #6S-V2) at the Air Force Base is located approximately 50 feet north of the Civil Engineering Squadron Building. The water level in this well has been dropping at a rate of about 6-7 feet per year through the last five years.

The South Carolina Water Resources Commission is very interested in obtaining additional ground water data and we would appreciate receiving any information gathered during your project.

We would like also to inform you that your project area is located in the Waccamaw Capacity Use Area and that all new test holes, observation wells and wells need to be permitted by the South Carolina Water Resources Commission.

Sincerely,

Teresa Greaney
Teresa Greaney
Geologist

TG:fw
Enclosure

SOUTH CAROLINA WATER RESOURCES COMMISSION

WELL TABULATIONS

SCWRC Well No.	Latitude Longitude	Owner/Location	Well Use	Total Depth	Pump Rate	Remarks
6T-11	33 38 34 78 56 40	City of Myrtle Beach	Public Supply	746	69,200 gpd	Location: At PirateLand Campground on the east side of U.S. Hwy 17, 1,400 feet southeast of the junction of Academy Drive and U.S. Hwy 17
6T-C1	33 39 05 78 57 16	Ocean Lakes Ltd c/o Ocean Lakes Family Campground	P.S.	462	28,800 gpd	Location: West side of S.C. Hwy 394, at the junction of Moonlight Drive and Orion Drive in Crystal Lake Mobile Home Village.
6S-T2	33 41 37 78 57 29	Grand Strand Water & Sewer Authority, Conway, SC	P.S.	432	72,000 gpd	Location: in the Watergate Subdivision, 2.5 miles east of the junction of S.C. Hwy 707 and S.C. Hwy 544, where 0.7 miles north of S.C. Hwy 707.
6S-T3	33 41 37 78 57 29	Grand Strand Water & Sewer Authority, Conway, SC	P.S.	421	79,200 gpd	Location: in the Watergate Subdivision, 2.5 miles east of the junction of S.C. Hwy 707 and S.C. Hwy 544, where 0.7 miles north of S.C. Hwy 707 (next to well # 6S-T2).
6S-S1	33 41 43 78 56 32	Grand Strand Water & Sewer Authority, Conway, SC	P.S.	463	28,800 gpd	Location: 100 feet south of S.C. Hwy 707, 3.5 miles east of junction of S.C. Hwy 707 and Hwy 544.
6S-K1	33 42 45 78 55 17	Four Seasons Ice Co., Conway, S.C.	P.S.	416	30,000 gpd	Location: 300 feet south west of the junction of S.C. Hwy 501 and Waterside Drive, Myrtle Beach.
5S-Y1	33 40 43 78 54 08	City of Myrtle Beach	P.S.	630	57,600 gpd	Location: 500 feet northwest of the intersection of U.S. Hwy 17 and 13th Ave S., Myrtle Beach.
5S-Y2	33 40 30 78 54 37	Aerovon Ceramics Co., Myrtle Beach	P.S.	560	20,000 gpd	Location: 1800 feet northwest of U.S. Hwy 17 on Aerovon Road, Myrtle Beach.
5S-Y3	33 40 12 78 54 39	City of Myrtle Beach	P.S.	674	77,200 gpd	Location: 500 feet southwest of the junction of 21st Ave N. and Cassandora Lane, Myrtle Beach.
5S-Y4	33 40 31 78 54 32	City of Myrtle Beach	P.S.	465	72,000 gpd	Location: 900 feet northwest of the junction of U.S. Hwy 17 and Aerovon Road, Myrtle Beach.
6T-a1	33 39 40 78 55 07	City of Myrtle Beach	P.S.	718	74,800 gpd	Location: 900 feet west of intersection of 25th Ave S. and Ocean Blvd., Myrtle Beach.

APPENDIX E
STATE WATER CLASSIFICATION
STANDARDS SYSTEMS

SOUTH CAROLINA CLASSIFICATION STANDARDS

(South Carolina Department of Health and Environmental Control Water Classification — Standards System; Adopted September 8, 1971; December 14, 1976; Approved by the U.S. Environmental Protection Agency April 18, 1977)

(Promulgated pursuant to Sec. 63-195.7 of the 1962 code, as amended)

SECTION I

DEFINITIONS

The definition of any word or phrase employed in Section II, III, or IV shall be the same as given in the South Carolina Pollution Control Law. The following words or phrases which are not defined in said law shall be defined or have meanings as follows:

1. *Agricultural* shall include use of water for stock watering, irrigation and other farm purposes.

2. *Conventional treatment* as applying to potable water supplies shall mean treatment including at least flocculation, sedimentation, filtration and disinfection.

3. *Direct Water contact* shall mean an activity where the human body may come into direct contact with water to the point of complete submergence, including but not limited to activities such as swimming, water skiing and skin diving.

4. *Fishing* shall mean the taking, harvesting, catching and the propagation of fish or shellfish.

5. *Mixing zone*, as used in Section III, Number 11, shall mean a designated area within which specified water quality standards are not applicable. The boundary of this zone shall be determined by the Department of Health and Environmental Control on an individual project basis after consideration of the waste discharge and the receiving waters. A mixing zone shall not prevent free passage of fish and shall not interfere with the designated use outside its established boundary.

6. *Natural or naturally occurring values* shall mean for all of the waters of the State:

(a) those water quality characteristics (physical; chemical and biological) which exist unaffected by — or unaffected as a consequence of — any water use by any person; or,

(b) those water quality characteristics (physical, chemical and biological) which exist unaffected by the discharge, or direct or indirect deposit of, any solid, liquid or gaseous substance by any person or as a result of any cultural activity.

7. *Point of discharge* shall mean that location in or adjacent to a body of water at which any liquid, solid or gaseous substances are discharged or deposited.

8. *Propagation* shall mean the continuance of species by generation or successive production in the natural environment, as opposed to the maintenance of species by artificial culture and stocking.

9. *Source of water supply for drinking, culinary or food processing purposes* shall mean any source, either public or private, the waters from which are used for domestic consumption, or used in connection with the processing of milk, beverages, food or for other purposes which require finished water meeting regulations established pursuant to Section 1412 of the Public Health Service Act as amended by the Safe Drinking Water Act (Public Law 93-523) and related regulations applicable to public water systems.

10. *Swamp waters* shall mean those waters which have been exposed for a substantial period of time to conditions which cause these waters to have all of the following natural characteristics:

(a) waters having those physical/chemical (i.e. low velocity, low dissolved oxygen, color, low pH) and biological characteristics found in waters which have been exposed for a substantial time to decaying, organic matter;

(b) waters which cover land areas much of the year having dense natural vegetation including trees.

Designation of waters of the State as "swamp waters" will be made by the Department of Health and Environmental Control on a case-by-case basis after appropriate analysis.

11. *Tidal salt waters* shall mean those waters whose elevation is subject to periodic changes due to oceanic tides and which have chloride ion content in excess of 250 milligrams per liter (mg/l) (salinity = 0.48 o/oo).

SECTION II

Waters whose existing quality is better than the established standards will not be lowered in quality unless and until it has been affirmatively demonstrated to the South Carolina Board of Health and Environmental

Control that such change is justifiable as a result of necessary economic or social development and will not interfere with or become injurious to any assigned uses made of such waters. Any industrial, public or private project or development which could constitute a new source of pollution or an increased source of pollution to high quality waters will be required by the South Carolina Department of Health and Environmental Control as part of the initial project design to insure a treatment level consistent with applicable State/Federal laws, rules and regulations. In implementing the policy of this paragraph, the Administrator of the Environmental Protection Agency will be advised and provided with such information as he will need from time to time to protect the interests of the United States and maintain the high quality of waters of that state.

SECTION III

RULES APPLICABLE TO ALL CLASSES AND STANDARDS

The General Assembly of South Carolina in the 1970 Pollution Control Act of South Carolina has declared the following policy: "It is declared to be the public policy of the State to maintain reasonable standards of purity of the water resources of the State, consistent with the public health, safety and welfare of its citizens, maximum employment, the industrial development of the State, the propagation and protection of terrestrial and marine flora and fauna, and the protection of physical property and other resources. It is further declared that to secure these purposes and the enforcement of the provisions of this act, the Department of Health and Environmental Control shall have authority to abate, control and prevent pollution."

Consistent with this policy, the Department of Health and Environmental Control of South Carolina does adopt general rules for the waters of South Carolina as follows:

1. The classes and standards set forth in Section IV are intended to implement the state policy by providing criteria for the streams of South Carolina which will stabilize and improve water quality in step with changes in the economy of the State and new technical developments. No permit issued hereunder, therefore, shall be interpreted as creating any vested right in any person.

2. No waters of this State shall be used for the sole or principal purpose of transporting wastes.

3. Any discharge into State waters must receive a degree of treatment and/or control which shall produce an effluent which is consistent with State and Federal laws, rules and regulations.

4. Tests or analytical determinations to determine compliance or non-compliance with standards shall be made in accordance with methods and procedures approved by the South Carolina Department of Health and Environmental Control.

5. In making any tests or analytical determinations on classified waters to determine compliance or non-compliance with water quality standards, representative samples shall be collected at locations approved by the Department of Health and Environmental Control.

(a) Samples shall be taken from points so distributed over the area and depth of the waters being studied as to permit a realistic appraisal of such actual or potential damage to water use or aquatic life as may exist.

(b) Bioassay methods may be employed in appropriate situations to determine median tolerance limits (TLM) and/or concentration of toxic substances.

(c) Temporal distribution of samples in tidal waters shall be such as to cover the full range of tidal conditions.

(d) The criteria of Section III.11.a.-d. and Section IV are applicable to any fresh water stream when the flow rate is equal to or greater than the minimum seven-day-average flow rate that occurs with an average frequency of once in ten years.

6. General water quality criteria and standards in Section IV are established to maintain the quality of the waters of the State.

(a) The waters of the State shall at all times be free from:

(1) substances attributable to sewage, industrial waste, or other waste that will settle to form sludge deposits that are unsightly, putrescent or odorous to such a degree as to create a nuisance, or that interfere directly or indirectly with water uses;

(2) floating debris, oil, grease, scum and other floating materials attributable to sewage, industrial waste, or other waste in amounts sufficient to be unsightly to such a degree as to create a nuisance or that interfere directly or indirectly with water uses;

(3) materials attributable to sewage, industrial waste, or other waste which produce taste, odor, or change the existing color or other physical or chemical conditions in the receiving stream to such a degree as to create a nuisance, or that interfere directly or indirectly with water uses; and

(4) high-temperature, toxic, corrosive or other deleterious substances attributable to sewage, industrial waste, or other waste in concentrations or combinations which interfere directly or indirectly with water uses, or which are harmful to human, animal, plant or aquatic life.

(b) These general criteria establish basic water quality requirements for all South Carolina waters and are to be implemented and enforced:

(1) for all waters for which no specific water quality standards are established;

(2) wherever and whenever specific water quality standards as established in Section III.11.a.-d. and Section IV are not applicable because natural flow conditions are lower than those which occur at the minimum seven-day average flow that occurs with a frequency of once in ten years;

7. In any case where a classified body of water is tributary to another body of water which is classified in a higher class, the quality of the water in the tributary shall be maintained at a level such that the water leaving the tributary will not cause a contravention of the standards of the downstream body.

8. In any case where waters are not classified and are tributary to classified waters, they shall meet the quality

standards and use restrictions specified for the classified water.

9. Natural waters may on occasion have characteristics outside of the limits established by the standards. In no case will effluent limitations for discharges to such waters be based upon characteristics of natural waters which are lower than limits established by the standards.

The specified standards will not be considered violated when values outside the established limits are caused by natural conditions. Where effluents are discharged to such waters, the discharger shall not be considered a contributor to substandard conditions provided compliance with permit conditions is maintained.

10. It is recognized that lakes, ponds and reservoirs, in whole or in part, will vary in their ability to successfully assimilate nutrient loadings. Due to the many factors which have a bearing on the effects of nutrients upon lakes, ponds and reservoirs, careful consideration must be given relative to the control of nutrients reaching these waters. Therefore, loadings of nutrients to lakes, ponds and reservoirs will be addressed on a case-by-case basis. Conditions to be considered shall include, but not be limited to, such factors as the hydrology and morphometry of the body, the existing and projected trophic state, and the characteristics of the loadings.

11.(a) The stream or portions of streams classified AA-TROUT as specified in the document *Stream Classifications for the State of South Carolina*, shall be considered mountain cold water streams and their temperature shall not be raised above natural conditions.

(b) All fresh waters of the State, other than those classified as AA-TROUT or referred to in 11.d., shall not exceed a maximum temperature of 32.2 degrees C (90 degrees F) at any time nor shall a maximum temperature rise above natural temperatures exceed 2.8 degrees C (5 degrees F) as a result of the discharge of heated liquids unless an appropriate temperature criteria or mixing zone, as provided below, has been established.

The water temperature at the inside boundary of the mixing zone shall not be more than 10 degrees C (18 degrees F) greater than that of water unaffected by the heated discharge. The appropriate temperature criteria or the size of the mixing zone will be determined on an individual project basis and will be based on biological, chemical, engineering and physical considerations. Any such determination shall assure the protection and propagation of a balanced, indigenous population of shellfish, fish and wildlife in and on a body of water to which the heated discharge is made and shall allow passage of aquatic organisms.

(c) The temperature of tidal salt waters shall not exceed a weekly average temperature of 2.2 degrees C (4 degrees F) outside a mixing zone above the natural temperature during the fall, winter or spring and shall not exceed a weekly average temperature of .8 degrees C (1.5 degrees F) outside a mixing zone above the natural temperature during the summer months. The size of the mixing zone will be determined on an individual project basis and will be based on biological, chemical, engineering and physical considerations. Any such determination shall assure the protection and propagation of a balanced, indigenous population of shellfish, fish and wildlife in

and on a body of water to which a heated discharge is made. Further, the mixing zone shall be kept at a minimum and shall allow the passage of aquatic organisms.

(d) All waters of lakes and reservoirs of the State shall not exceed a weekly average temperature of 32.2 degrees C (90 degrees F) after adequate mixing of heated and normal waters as a result of heated liquids, nor shall a weekly average temperature rise above natural temperatures exceed 2.8 degrees C (5 degrees F) as a result of the discharge of heated liquids unless an appropriate temperature criteria or mixing zone, as provided below, has been established.

The water temperature at the inside boundary of the mixing zone shall not be more than 10 degrees C (18 degrees F) greater than that of water unaffected by the heated discharge. The appropriate temperature criteria or the size of the mixing zone will be determined on an individual project basis and will be based on biological, chemical, engineering and physical considerations. Any such determination shall assure the protection and propagation of a balanced, indigenous population of shellfish, fish and wildlife in and on a body of water to which the heated discharge is made and shall allow passage of aquatic organisms.

(e) All temperature limits will be subject to modifications as specified under State/Federal laws, rules and regulations.

(f) Upon a case-by-case determination by the South Carolina Department of Health and Environmental Control and in accordance with State/Federal laws, rules and regulations, the above temperature criteria may not apply to cooling water bodies with a primary purpose of providing a source and/or receptor of industrial cooling water.

12. The latest edition of the "Quality Criteria for Water" published by the Environmental Protection Agency pursuant to Section 304 (a) (1) of Public Law 92-500 (the Federal Water Pollution Control Act Amendments of 1972) or other documents approved by the Department of Health and Environmental Control shall be used as a guide in determining detrimental levels of parameters other than those given in Section III.11.a.-d. and Section IV of this document.

SECTION IV

ESTABLISHED CLASSES FOR FRESH SURFACE WATERS AND THE STANDARDS OF QUALITY AND PURITY WHICH SHALL BE APPLIED THERETO:

CLASS AA

Waters suitable for use for domestic and food processing purposes with treatment levels as specified by the Department of Health and Environmental Control, or waters which constitute an outstanding recreational or ecological resource. Suitable, where specified, in the document, *Stream Classifications for the State of South Carolina*, for trout fishing ("fishing" as defined in Section I of this document). Also suitable for uses requiring water of lesser quality.

QUALITY STANDARDS FOR CLASS AA WATERS

Items: 1. Sewage, treated waste, thermal discharges, toxic wastes, deleterious substances, colored or other wastes.

Specifications: None.

Item: 2. Dissolved oxygen.

Specifications: Class AA-TROUT waters shall be maintained at their natural condition of 6 mg/l with a daily average of 7 mg/l whichever is the greater. All other Class AA waters must have an average of 6 mg/l except where natural conditions can be shown to contribute to values below this, throughout the year.

Item: 3. Fecal coliform.

Specifications: Not to exceed 20/100 ml as a monthly arithmetic average.

CLASS A

Waters suitable for direct water contact use. Suitable also for other uses requiring waters of lesser quality.

QUALITY STANDARDS FOR CLASS A WATERS

Items: 1. Toxic wastes, deleterious substances, colored or other wastes.

Specifications: None in amounts exceeding limitations established and adopted by the Department of Health and Environmental Control to protect waters of this class. In establishing and adopting limits, the Department of Health and Environmental Control will be guided by Section 1412 Public Health Service Act, amended by the Safe Drinking Water Act (P.L. 93-523) and related regulations.

Item: 2. Dissolved oxygen.

Specifications: Not less than 5 mg/l except that swamp waters may have an average of 4 mg/l.

Item: 3. Fecal coliform.

Specifications: Not to exceed a geometric mean of 200/100 ml nor shall more than 10% of the total samples during any 30 day period exceed 400/100 ml.

Item: 4. pH.

Specifications: Range between 6.0 and 8.0, except that swamp waters may range from pH 5.0 to pH 8.0.

CLASS B

Waters suitable for domestic supply after conventional treatment in accordance with requirements of the South Carolina State Board of Health and Environmental Control. Suitable also for propagation of fish, industrial and agricultural uses and other uses requiring water of lesser quality.

QUALITY STANDARDS FOR CLASS B WATERS

Items: 1. Toxic wastes, deleterious substances, colored or other wastes.

Specifications: None in amounts exceeding limitations established and adopted by the Department of Health and Environmental Control to protect waters of this class. In establishing and adopting limits the Department of Health and Environmental Control will be guided by

Section 1412 Public Health Service Act, amended by the Safe Drinking Water Act (P.L. 93-523) and related regulations.

Item: 2. Dissolved oxygen.

Specifications: Daily average not less than 5 mg/l with a low of 4 mg/l except that swamp waters may have an average of 4 mg/l.

Item: 3. Fecal coliform.

Specifications: Not to exceed a geometric mean of 1000/100 ml based on five consecutive samples during any 30 day period; nor to exceed 2000/100 ml in more than 20% of the samples examined during such period (not applicable during or following periods of rainfall).

Item: 4. pH.

Specifications: Range between 6.0 and 8.5 except that swamp waters may range from pH 5.0 to pH 8.5.

CLASSES AND STANDARDS FOR TIDAL SALT WATERS**CLASS SAA**

Waters suitable for uses that require the absence of pollution (South Carolina Pollution Control Act Section 1(7)) and/or waters which constitute an outstanding recreational or ecological resource. Suitable also for use requiring water of lesser quality.

QUALITY STANDARDS FOR CLASS SAA WATERS

Items: 1. Garbage, cinders, ashes, oils, sludge, or other refuse.

Specifications: None.

Items: 2. Sewage, treated wastes, thermal discharges, toxic wastes, deleterious substances, colored or other wastes.

Specifications: None.

Item: 3. Dissolved oxygen.

Specifications: Not less than 5 mg/l.

Item: 4. Organisms of coliform group.

Specifications: Not to exceed a median coliform of 70/100 ml, nor shall more than 10% of the samples in a five (5) tube dilution test exceed a MPN of 230/100 ml; or current Department of Health and Environmental Control and Federal Drug Administration standards.

Item: 5. pH.

Specifications: Not outside of naturally occurring values.

CLASS SA

Waters suitable for propagation, survival and harvesting of shellfish for market purposes as designated by the Department of Health and Environmental Control. Suitable also for uses requiring water of lesser quality.

QUALITY STANDARDS FOR CLASS SA WATERS

Items: 1. Garbage, cinders, ashes, oils, sludge or other refuse.

Specifications: None.

Item: 2. Sewage of waste effluents.

Items: 3. Toxic wastes, deleterious substances, colored or other wastes.

Specifications: None alone or in combination with other substances or wastes in sufficient amounts as to be injurious to edible fish or shellfish or the culture or propagation thereof, or which in any manner shall adversely affect the flavor, color, odor, or sanitary condition thereof or impair the waters for any other best usage as determined for the specific waters which are assigned to this class.

Item: 4. Dissolved oxygen.

Specifications: Not less than 5 mg/l.

Item: 5. Organisms of coliform group.

Specifications: Not to exceed a median coliform of 70/100 ml, nor shall more than 10 percent of the samples in a five (5) tube dilution test exceed a MPN of 230/100 ml; or current Department of Health and Environmental Control and Federal Drug Administration standards.

Item: 6. pH.

Specifications: Shall not vary more than 3/10 of a pH unit above or below that of effluent-free waters in the same geological area having a similar total salinity, alkalinity and temperature.

CLASS SB

Waters suitable for direct water contact and for survival and propagation of shellfishing except shellfishing for market purposes. Suitable also for uses requiring water of lesser quality.

QUALITY STANDARDS FOR CLASS SB WATERS

Items: 1. Garbage, cinders, ashes, oils, sludge or other refuse.

Specifications: None.

Item: 2. Sewage or waste effluents.

Specifications: None which are not effectively treated and disinfected.

Items: 3. Toxic wastes, deleterious substances, colored or other wastes.

Specifications: None alone or in combination with other substances or wastes in sufficient amounts as to be injurious to edible fish or shellfish or the culture or propagation thereof, or which in any manner shall adversely affect the flavor, color, odor, or sanitary condition thereof; to make the waters unsafe or unsuitable for bathing or impair the waters for any other best usage as determined for the specific waters which are assigned to this class.

Item: 4. Dissolved oxygen.

Specifications: Not less than 5 mg/l.

Item: 5. Fecal coliform.

Specifications: Not to exceed a geometric mean of 200/100 ml; nor shall more than 10% of the samples in any 30 day period exceed 400/100 ml.

Item: 6. pH.

Specifications: Shall not vary more than one-half of a pH unit above or below that of effluent-free waters in the same geological area having a similar total salinity, alkalinity and temperature, but not lower than 6.75 or above 8.5.

CLASS SC

Waters suitable for crabbing, commercial fishing and for the survival and propagation of marine fauna and flora.

QUALITY STANDARDS FOR CLASS SC WATERS

Items: 1. Garbage, cinders, ashes, oils, sludge or other refuse.

Specifications: None.

Items: 2. Toxic wastes, oils, deleterious substances, colored or other wastes.

Specifications: None alone or in combination with other substances or wastes in sufficient amounts as to be injurious to edible fish or the culture or propagation thereof, or which in any manner shall adversely affect the flavor, color, odor, or sanitary condition of fish or impair the waters for any other best usage as determined for the specific waters which are assigned to this class.

Item: 3. Dissolved oxygen.

Specifications: Not less than 4 mg/l.

Item: 4. Fecal coliform.

Specifications: Not to exceed a geometric mean of 1000/100 ml based on five consecutive samples during any 30 day period; nor exceed 2000/100 ml in more than 20% of the samples examined during such period (not applicable during or immediately following periods of rainfall).

Item: 5. pH.

Specifications: Shall not vary more than one pH unit above or below that of effluent-free waters in the same geological area having a similar total salinity, alkalinity and temperature but not lower than 6.75 or above 8.5.

STREAM CLASSIFICATIONS

1. *Authority For Adoption Of Classifications:* (S.C. Code of Laws, 1962 and 1971 Cumulative Supplement)

Section 63-195.9. Classification and standards of quality and purity of air and waters; alteration of classification standards; notice and hearing required. It is recognized that, due to variable factors, no single standard of quality and purity of the ambient air or waters is applicable to all ambient air or waters of the State. In order to attain the objectives of this chapter, the Authority, after proper study and after conducting a public hearing upon due notice, shall group the designated waters into classes. The classification and the standards of quality and purity of ambient air and waters for each classification shall be adopted by the Authority in relation to the public use or benefit to which such air or waters are or may in the future be put. Such classification and standards may from time to time be altered or modified by the Authority, but in no event shall such classification or standard be lowered.

The adoption of a classification of the waters and the standards of quality and purity of air and water above prescribed shall be made by the Authority only after public hearing on due notice as provided by this chapter. (1962 Code Section 70-112; 1952 Code Section 70-112; 1950 (46) 2153; 1970 (56) 1512).

Section 63-195.11. Considerations for classification and standards for water. In adopting the classification of waters and the standards of purity and quality, consideration shall be given to:

(1) The size, depth, surface area covered, volume, direction, rate of flow, stream gradient and temperature of the water;

(2) The character of the district bordering such water and its peculiar suitability for the particular uses and with a view to conserving it and encouraging the most appropriate use of the lands bordering on such water for residential, agricultural, industrial or recreational purposes;

(3) The uses which have been made, are being made or may be made of such waters for transportation, domestic and industrial consumption, irrigation, bathing, fishing and fish culture, fire prevention, sewage disposal or otherwise; and

(4) The extent of present defilement or fouling of such waters which has already occurred or resulted from past discharges therein. (1962 Code Section 70-114; 1952 Code Section 70-114; 1950 (46) 2153; 1970 (56) 2512).

I. Criteria For Classes:

All adopted classifications must conform to the standards contained within State Water Classification Standards System as adopted by the South Carolina Pollution Control Authority on September 8, 1971 and filed with the South Carolina Secretary of State on September 10, 1971.

III. Tributary To Classified Waters:

In any case where streams are not otherwise classified and are tributaries to a classified stream they shall meet the quality standards of the classified stream.

IV. Significance Of Dates:

The filing date after each classified body of water represents the date on which the adopted classification was filed with the South Carolina Secretary of State.

On file with the Secretary of State and the Pollution Control Authority are the date and place of each public hearing on stream classification and the date on which the classifications was adopted by the Pollution Control Authority.

V. Status Of Classifications:

The classification for all bodies of water contained herein supersedes all previous classifications.

ALLAN CREEK (also called Allen Creek): Spartanburg County. The entire stream tributary to Enoree River, *Class B*. Filed August 7, 1972.

ARCHER CREEK: Beaufort County. That portion from Port Royal to U.S. Government Parris Island Bridge, *Class SB*; from the Bridge to Broad River, *Class SA*. Filed March 15, 1968.

ASHEPOO RIVER: Colleton County. That portion to salt water intrusion, *Class B*. Filed August 7, 1972; Salt water intrusion to Atlantic Ocean, *Class SA*. Filed November 5, 1955.

ASHLEY RIVER: Dorchester and Charleston Counties. That portion to salt water intrusion, *Class B*. Filed September 27, 1954 and August 7, 1972; Salt water intrusion to Charleston Harbor, *Class SC*. Filed September 27, 1954.

ASHPOLE SWAMP: Dillon and Marion County. The entire stream tributary to Lumber River, *Class A* (swamp). Filed June 8, 1956.

BACK RIVER: Berkeley County. The entire stream tributary to Cooper River, *Class B*. Filed September 27, 1954.

BAILEY CREEK: Anderson County. The entire stream tributary to Rocky River, *Class B*. Filed June 29, 1953.

BAKER CREEK: McCormick County. The entire stream tributary to Clark Hill Reservoir, *Class B*. Filed May 26, 1955.

BARTONS BRANCH (Summerhouse Branch and Johnsons Swamp): Williamsburg and Georgetown Counties. The entire stream tributary to Black River, *Class B* (swamp). Filed August 7, 1972.

BATTERY CREEK: Beaufort County. The entire stream tributary to Beaufort River, *Class SB*. Filed March 15, 1968.

BEAR CREEK: Newberry and Lexington Counties. The entire stream tributary to Lake Murray, *Class B*. Filed August 7, 1972.

BEAR CREEK: Lancaster County. The entire stream tributary to Cane Creek, *Class B*. Filed December 7, 1962.

BEAR SWAMP: Dillon County. The entire stream tributary to Ashpole Swamp, *Class A* (swamp). Filed June 8, 1956.

BEARDS FORK CREEK: Laurens County. The entire stream tributary to Duncan Creek, *Class B*. Filed August 7, 1972 and March 31, 1954.

BEAUFORT RIVER: Beaufort County. The entire stream tributary to Port Royal Sound, *Class SB*. Filed November 5, 1955.

BEAVER CREEK: Anderson County. The entire stream tributary to Rocky River, *Class B*. Filed August 7, 1972.

BEAVERDAM CREEK: Edgefield County. The entire stream tributary to Turkey Creek, *Class B*. Filed August 7, 1972 and March 31, 1954.

BEAVER CREEK: Kershaw County. The entire stream tributary to Wateree Lake, *Class A*. Filed January 18, 1957.

BEAVERDAM CREEK: Anderson County. The entire stream tributary to Rocky River, *Class B*. Filed June 29, 1953.

BEAVERDAM CREEK: Darlington and Chesterfield Counties. The entire stream tributary to Black Creek, *Class A*. Filed August 7, 1972.

BEAVERDAM CREEK (also called Irene Creek): Cherokee County. The entire stream tributary to Thicketty Creek, *Class B*. Filed August 7, 1972.

BEAVERDAM CREEK: Laurens County. The entire stream tributary to Enoree River, *Class A*. Filed October 15, 1969.

BEAVERDAM CREEK: Marlboro County. The headwaters to the upper end of McLaurins Pond, *Class B*; McLaurins Mill Pond to Little Pee Dee River, *Class A*. Filed June 8, 1956.

BEAVERDAM CREEK: York County. The entire stream tributary to Crowder's Creek, *Class B*. Filed August 7, 1972.

BEES CREEK: Jasper County. The entire stream tributary to Coosawhatchie River, *Class SC*. Filed November 5, 1955.

BELL SWAMP CREEK: Dillon County. The entire stream tributary to Little Pee Dee River, *Class A*. Filed August 7, 1954.

BETSY CREEK: Anderson County. The entire stream tributary to Beaver Creek, *Class B*. Filed August 7, 1972.

BIG ALLISON CREEK: York County. The entire stream tributary to Lake Wylie, *Class B*. Filed August 7, 1972.

BIG BOGGY SWAMP: Darlington County. The entire stream tributary to McIntosh Mill Stream, *Class A*. Filed August 7, 1972.

BIG CREEK: Anderson County. The entire stream tributary to Saluda River, *Class B*. Filed August 7, 1972 and September 27, 1963.

BIG GENEROSTEE CREEK: Anderson County. The entire stream tributary to Savannah River, *Class B*. Filed August 7, 1972.

BIG PINE TREE CREEK: Kershaw County. Headwaters through Hermitage Mill Canal, *Class A*. Filed January 18, 1957; Hermitage Mill Canal to Wateree River, *Class B*. Filed August 7, 1972.

BIG ROCK CREEK: Greenwood County. The entire stream tributary to Wilson Creek, *Class B*. Filed October 5, 1953.

BIG SWAMP: Florence County. The entire stream tributary to Lynches River, *Class B (swamp)*. Filed August 7, 1972.

BLACK CREEK: Darlington, Chesterfield and Florence Counties. From its headwaters to S.C. 145, *Class B*; from S.C. 145 through Prestwood Reservoir at Hartsville, *Class A (swamp)*. Filed June 8, 1956. From Prestwood Reservoir to U.S. 52, *Class B (swamp)*. Filed August 7, 1972. From U.S. 52 to S.C.L. Railroad bridge east of Hartsville, *Class B*; from the S.C.L. Railroad bridge to its confluence with Pee Dee River, *Class A*. Filed January 21, 1969.

BLACK RIVER: Lee, Sumter, Clarendon, Williamsburg and Georgetown Counties. From the headwaters to the confluence with Pocotaligo River, *Class B (swamp)*; from this point to the junction with U.S. 701, *Class A (swamp)*; from U.S. 701 to Winyah Bay, *Class SB*. Filed June 8, 1956.

BLUE HILL CREEK: Abbeville County. The entire stream tributary to Norris Creek, *Class B*. Filed August 7, 1972 and May 26, 1955.

BOHICKET CREEK: Charleston County. From its junction with North Edisto River to its junction with Church Creek, *Class SA*. Filed March 15, 1968.

BRANCH FROM HAILE GOLDMINE: Lancaster County. The entire stream tributary to Lynches Creek, *Class B*. Filed August 7, 1972.

BRICKYARD CREEK: Beaufort County. The entire stream tributary to Beaufort River, *Class SA*. Filed November 5, 1955.

BRICKYARD CREEK: Charleston County. The entire stream tributary to Ashley River, *Class SC*. Filed September 27, 1954.

BROAD CREEK: Beaufort County. The entire stream tributary to Calibogue Sound, *Class SA*. Filed March 15, 1968.

BROAD RIVER (Main Stem): Cherokee, York, Union, Chester, Newberry, Fairfield and Richland Counties. The entire stream tributary to Congaree River, *Class B*. Filed February 24, 1953.

BROAD RIVER: Jasper and Beaufort Counties. The entire stream tributary to Port Royal Sound, *Class SA*. Filed November 5, 1955.

BROADMOUTH CREEK: Abbeville and Anderson Counties. The entire stream tributary to Saluda River, *Class B*. Filed August 7, 1972.

BROADWAY CREEK: Anderson County. Headwaters from Broadway Creek to backwaters of Broadway Lake, *Class B*; Broadway Lake to Rocky River, *Class A*. Filed January 27, 1956.

BROWNS SWAMP: Marion County. The entire stream tributary to Pee Dee River Swamp, *Class B (swamp)*. Filed August 7, 1972.

BRUSHY CREEK: Greenville County. Headwaters northeast of Greenville to Enoree River, *Class B*. Filed November 7, 1956.

BRUSHY CREEK: Greenville County. The entire stream tributary to Reedy River, *Class B*. Filed August 7, 1972.

BRUSHY CREEK: Pickens County. The entire stream tributary to Saluda River, *Class B*. Filed August 7, 1972.

BUCK CREEK: Barnwell County. The entire stream tributary to Salkehatchie River, *Class B*. Filed August 7, 1972.

BUCK CREEK: Spartanburg County. The entire stream tributary to Pacolet River, *Class B*. Filed August 7, 1972.

BUCK SWAMP: Dillon, Marion and Marlboro Counties. The entire stream tributary to Little Pee Dee River, *Class B (swamp)*. Filed August 7, 1972.

BUFFALO CREEK: Cherokee County. The entire stream tributary to Broad River, *Class B*. Filed January 18, 1962 and March 20, 1964.

BUFFALO CREEK: Union County. The entire stream tributary to Fairforest Creek, *Class B*. Filed August 7, 1972.

BULL BRANCH: Marlboro County. The entire stream tributary to Hagins Prong, *Class B*. Filed August 7, 1972.

BULL CREEK: Horry County. Pee Dee River to Waccamaw River, *Class B*. Filed March 15, 1968.

BULLOCKS CREEK: York County. Headwaters to Broad River, *Class A*. Filed August 25, 1969.

BULL RUN BRANCH: Chester County. The entire stream within Chester County, *Class A*. Filed January 22, 1959.

BULL SWAMP CREEK: Lexington and Orangeburg Counties. That portion of the stream above Swansea, *Class A*. Filed February 16, 1956; that portion below Swansea, *Class B*. Filed August 7, 1972.

BURDINE CREEK: Pickens County. The entire stream tributary to Georges Creek, *Class B*. Filed June 28, 1954.

BURNETTS CREEK: Saluda County. The entire stream tributary to Little Saluda River, *Class B*. Filed August 7, 1972.

BURNTGIN LAKE: Sumter County. The entire lake located on the western reaches of Cane Savannah Creek, *Class A*. Filed January 24, 1972.

BUSH CREEK (or River): Laurens and Newberry Counties. The entire stream tributary to Lake Murray, *Class B*. Filed October 14, 1955 and August 7, 1972.

BYRUM'S CREEK (Branch from Appleton Mill to Whitner Creek): Anderson County. The entire stream tributary to Whitner Creek, *Class B*. Filed August 7, 1972.

CALHOUN CREEK: Abbeville County. The entire stream tributary to Little River, *Class B*. Filed August 7, 1972.

CALIBOGUE SOUND: Beaufort County. The entire sound tributary to Atlantic Ocean, *Class SA*. Filed March 15, 1968.

CANE CREEK: Lancaster County. The entire stream tributary to Catawba River, *Class B*. Filed August 7, 1972.

CANE CREEK: Oconee County. That portion through the Walhalla Water Reservoir, *Class B*. Filed May 24, 1954; That portion below County Road 202, *Class B*. Filed February 3, 1955.

CANNONS CREEK: Newberry County. The entire stream tributary to Board River, *Class B*. Filed October 14, 1955.

CANOE CREEK: Anderson County. The entire stream tributary to Little Generostee Creek, *Class B*. Filed August 7, 1972.

CAPE ROMAIN HARBOR: Charleston County. The entire stream tributary to Atlantic Ocean, *Class SA*. Filed March 15, 1968.

CATAWBA-WATEREE RIVER: York, Lancaster, Chester, Fairfield, Kershaw, Richland and Sumter Counties. The entire stream tributary to Lake Marion, *Class B*. Filed February 17, 1954.

CATFISH CREEK: Marion County. The entire stream tributary to Pee Dee River, *Class B (swamp)*. Filed August 7, 1972.

CAUSEWAY BRANCH: Sumter County. The entire stream tributary to Second Mill Pond, *Class B*. Filed December 22, 1972.

CAW CAW SWAMP: Allendale and Hampton Counties. The entire stream tributary to Whippy Swamp, *Class B*. Filed August 7, 1972.

CEDAR CREEK: Darlington and Chesterfield Counties. The entire stream tributary to Pee Dee River, *Class A*. Filed August 7, 1972.

CEDAR CREEK: Fairfield and Richland Counties. The entire stream tributary to Broad River, *Class B*. Filed August 7, 1972.

CEDAR CREEK: Richland County. The entire stream tributary to Congaree River, *Class A*. Filed January 26, 1972.

CEMETERY CREEK (or Silver Brook Creek): Anderson County. The entire stream tributary to Rocky River, *Class B*. Filed August 7, 1972.

CHARLESTON HARBOR: Charleston County.

From Battery to Atlantic Ocean, *Class SC*. Filed March 15, 1968.

CHATOOGA RIVER: Oconee County. The entire stream tributary to Tugaloo River, *Class A*. Filed March 15, 1968.

CHAUGA CREEK (also called Jerry Creek): Oconee County. From headwaters through Oconee State Park swimming area, *Class A*; From this point to Chauga River, *Class B*. Filed May 24, 1954.

CHAUGA RIVER: Oconee County. Headwaters to 1 mile above U.S. 76, *Class AA*. Filed May 24, 1954; from 1 mile above U.S. 76 to Tugaloo River, *Class B*. Filed August 1, 1955.

CHEROKEE CREEK: Anderson County. The entire stream tributary to Hen Coop Creek, *Class B*. Filed August 7, 1972.

CHEROKEE CREEK: Cherokee County. The entire stream tributary to Broad River, *Class B*. Filed February 24, 1953 and August 7, 1972.

CHICKASAW CREEK: Abbeville County. The entire stream tributary to Little Pee Dee River, *Class B*. Filed March 24, 1955 and August 7, 1972.

CHOESTOE CREEK: Oconee County. The entire stream tributary to Hartwell Reservoir, *Class B*. Filed August 7, 1972.

CHOWAN CREEK: Beaufort County. The entire stream tributary to Beaufort River, *Class SA*. Filed November 5, 1955.

CLARK CREEK: Williamsburg and Florence Counties. The entire stream tributary to Pee Dee River, *Class B (swamp)*. Filed August 7, 1972.

CLARK HILL RESERVOIR: McCormick County. The entire reservoir on the Savannah River, *Class A*. Filed March 15, 1968.

CLARK SOUND: Charleston County. The entire sound tributary to Charleston Harbor, *Class SC*. Filed March 15, 1968.

CLARKS CREEK: York County. The entire stream tributary to Bullocks Creek, *Class A*. Filed August 25, 1969.

CLOUDS CREEK: Saluda County. The entire stream tributary to Lake Murray, *Class B*. Filed August 7, 1972.

COASTAL WATERS: Charleston County. From the land to the limits of State jurisdiction, *Class SA*. Filed March 15, 1968.

COASTAL WATER: Georgetown and Horry Counties. From the land to the limits of State jurisdiction, *Class SA*. Filed March 15, 1968.

COASTAL WATER: Jasper, Beaufort and Colleton Counties. Coastal waters offshore to the land to the limits of the State jurisdiction, *Class SA*. Filed March 15, 1968.

COLLETON RIVER: Beaufort County. The entire stream tributary to Port Royal Sound, *Class SA*. Filed November 5, 1955.

COMBAHEE-SALKEHATCHIE RIVER: Barnwell, Bamberg, Allendale, Hampton, Colleton and Beaufort Counties. That portion of the stream to salt water intrusion, *Class A*; from salt water intrusion to St. Helena Sound, *Class SA*. Filed November 5, 1955.

CONEROSS CREEK: Oconee County. That portion through Negro Fork Creek, *Class A*. Filed May 24, 1954 and March 22, 1962.

CONGAREE CREEK: Lexington County. That portion of the stream above the Cayce intake, *Class A*. Filed October 14, 1955; from that point to the Congaree River *Class B*. Filed August 7, 1972.

CONGAREE RIVER: Richland, Lexington and Calhoun Counties. The entire stream tributary to Lake Marion, *Class B*. Filed August 7, 1972.

CONTRARY SWAMP: Dillon County. The entire stream from its headwaters to the North Carolina line near South of the Border, *Class B*. Filed August 7, 1972.

COOPER RIVER: Berkeley and Charleston Counties. That portion of the stream from U.S. 52 to a point approximately 30 miles above the junction of the Ashley and Cooper Rivers, *Class B*. Filed September 27, 1954 and February 24, 1953. That portion below that point to the junction of the Ashley and Cooper Rivers, *Class SC*. Filed February 24, 1953.

COOPER RIVER: Beaufort County. The entire stream tributary to Calibouge Sound, *Class SA*. Filed November 5, 1955.

COOSAW RIVER: Beaufort County. The entire stream tributary to St. Helena Sound, *Class SA*. Filed November 5, 1955.

COOSAWHATCHIE RIVER: Allendale Hampton and Jasper Counties. Headwaters to salt water intrusion, *Class A*. Salt water intrusion to Broad River, *Class SA*. Filed November 5, 1955.

COPAHEE SOUND: Charleston County. The entire sound, *Class SA*. Filed March 15, 1968.

CORNER CREEK: Abbeville County. The entire stream tributary to Little River, *Class B*. Filed August 7, 1972.

CORONACA CREEK: Greenwood County. The entire stream Tributary to Wilson Creek, *Class B*. Filed October 5, 1953.

COWPEN SWAMP: Dillon County. The entire stream tributary to Bear Swamp, *Class A (swamp)*. Filed June 8, 1956.

COWPENS CREEK: Cherokee County. The entire stream tributary to Little Thicketty Creek, *Class B*. Filed August 7, 1972.

COX BRANCH: Bamberg County. The entire stream tributary to Lemon Creek, *Class B*. Filed August 7, 1972.

CRANE CREEK: Richard County. That portion above Lake Elizabeth (Best Lake), *Class A*. Filed February 17, 1954. From Lake Elizabeth to Broad River, *Class B*. Filed August 7, 1972.

CRIMMS CREEK: Newberry County. The entire stream tributary to Broad River, *Class B*. Filed August 7, 1972.

CROOKED CREEK: Marlboro County. That portion of the stream above S.C. 9 at Bennettsville, *Class A*. Filed June 8, 1956; from S.C. 9 to Pee Dee River, *Class B*. Filed August 7, 1972.

CROWDERS CREEK: York County. The entire stream tributary to Lake Wylie, *Class B*. Filed August 7, 1972.

CYPRESS SWAMP: Dorchester County. The entire stream tributary to Ashley River, *Class B*. Filed September 27, 1954.

DIVERSION CANAL: Berkeley County. The entire canal between Lake Marion and Lake Moultrie, *Class A*. Filed March 15, 1968.

DOOLITTLE CREEK: Cherokee County. The entire stream tributary to Broad River, *Class B*. Filed August 7, 1972.

DOUBLE BRANCH: Abbeville County. The entire stream tributary to Long Cane Creek, *Class B*. Filed August 7, 1972.

DRY BRANCH (also known as Dye Branch): York County. The entire stream tributary to Jones Branch, *Class B*. Filed August 7, 1972.

DRY FORK BRANCH: Chester County. The entire stream tributary to Sandy River, *Class B*. Filed August 7, 1972.

DUCK CREEK: Allendale County. The entire stream tributary to Coosawhatchie River, *Class B*. Filed August 7, 1972.

DUNCAN CREEK: Laurens and Newberry Counties. That portion of the stream in Laurens County, *Class B*. Filed March 31, 1954 and August 7, 1972. From the Laurens and Newberry County line to the Whitmire discharge, *Class A*. Filed October 14, 1955. From the Whitmire discharge to the Enoree River, *Class B*. Filed August 7, 1972.

DUNCAN CREEK: Lexington County. The entire stream tributary to Chinzupin Creek, *Class B*. Filed October 14, 1955.

DURBIN CREEK: Greenville and Laurens County. The entire stream tributary to Enoree River, *Class B*. Filed August 7, 1972.

DUTCHMANS CREEK: Fairfield County. The entire stream tributary to Lake Wateree, *Class B*. Filed August 7, 1972.

DUTCHMANS CREEK (also known as Big Dutchmans Creek): York County. The entire stream tributary to Catawba River, *Class B*. Filed August 7, 1972.

DYE BRANCH: York County. See Dry Branch in (York County).

EAST BEARDS CREEK: Anderson County. The entire stream tributary to Wilson Creek, *Class B*. Filed August 7, 1972.

EAST ROCK CREEK: Anderson County. The entire stream tributary to Broadway Creek, *Class B*. Filed August 7, 1972.

EAST FORK (also known as Fork Creek): Chesterfield County. The entire stream tributary to Lynchess River, *Class B*. Filed August 7, 1972.

EDISTO RIVER (Main Stem): Orangeburg, Bamberg, Dorchester, Colleton and Charleston Counties. The entire stream to the North Edisto and South Edisto Rivers, *Class A*. Filed July 13, 1956.

EIGHTEEN MILE CREEK: Pickens and Anderson Counties. The entire stream tributary to Hartwell Reservoir, *Class B*. Filed August 7, 1954, August 7, 1972 and June 29, 1953.

ENOREE RIVER: Greenville, Spartanburg, Laurens, Union and Newberry Counties. The entire stream tributary to Broad River, *Class B*. Filed April 7, 1953; April 17, 1953; April 23, 1955 and August 7, 1972.

FAIRFOREST CREEK: Spartanburg and Union Counties. The entire stream tributary to Broad River, *Class B*. Filed August 7, 1972.

FIELDS CUT: Jasper County. The entire stream, *Class SB*. Filed March 15, 1968.

FIRST CREEK: Lexington County. The entire stream tributary to Congaree Creek, *Class A*. Filed October 14, 1955.

FISHING CREEK: Chester and York Counties. From headwaters to S.C. 72, *Class A*. Filed June 26, 1959. From S.C. 72 to Lando intake, *Class B*. Filed November 3, 1953; and January 22, 1959. From the Lando intake to Catawba River, *Class B*. Filed August 7, 1972.

FISHING CREEK LAKE: Chester and Lancaster Counties. The entire Lake on Catawba River, *Class A*. Filed September 7, 1972.

FLAGREED CREEK: Abbeville County. The entire stream tributary to Calhoun Creek, *Class B*. Filed August 7, 1972.

FOLLY RIVER: Charleston County. The entire stream tributary to Stono River, *Class SA*. Filed March 15, 1968.

FORK CREEK: Chesterfield County. See East Fork in (Chesterfield County).

FOUR HOLE SWAMP: Orangeburg, Corchester, Berkeley and Calhoun Counties. The entire stream tributary to Edisto River, *Class B (swamp)*. Filed February 16, 1956.

FOUR MILE CREEK: Orangeburg County. The entire stream tributary to North Fork Edisto River, *Class B*. Filed February 16, 1956.

FOURTEEN MILE CREEK: Lexington County. The entire stream tributary to Twelve Mile Creek, *Class B*. Filed October 14, 1955.

FRIPP INLET: Beaufort County. The entire stream tributary to Atlantic Ocean, *Class SA*. Filed November 5, 1955.

FROWHAWK CREEK: Spartanburg County. The entire stream tributary to South Tyger River, *Class B*. Filed August 7, 1972.

GAFFNEY CREEK: Cherokee County. See Peoples Creek in (Cherokee County).

GEORGES CREEK (and branch from Easley): Pickens County. The entire stream tributary to Saluda River, *Class B*. Filed August 7, 1972.

GILLARD CREEK: Greenville County. See Gilders Creek in (Greenville County).

GILDERS CREEK (also known as Gillard Creek): Greenville County. The entire stream tributary to Enoree River, *Class B*. Filed August 7, 1972.

GILLS CREEK: Richland County. From the headwaters through Forest Lake, *Class A*. Filed February 17, 1954; from Forest Lake to Congaree River, *Class B*. Filed August 7, 1972.

GOLDEN CREEK: Pickens County. The entire stream tributary to Twelve Mile Creek, *Class B*. Filed August 7, 1972.

GRANNY'S QUARTER CREEK: Kershaw County. The entire stream tributary to Wateree River, *Class A*. Filed January 18, 1957.

GRAPEVINE BRANCH: Bamberg County. The entire stream tributary to Lemon Creek, *Class B*. Filed August 7, 1972.

GRASSY RUN BRANCH: Chester County. The entire stream tributary to Rocky Creek, *Class B*. Filed August 7, 1972.

GRAYS SOUND: Charleston County. The entire sound, *Class SA*. Filed March 15, 1968.

GREAT FALLS LAKE: Chester and Lancaster Counties. The entire lake on Catawba River, *Class A*. Filed September 7, 1971.

GREEN SWAMP: Sumter County. That portion from its headwaters to S.C. Highway #380, *Class B*. That portion from S.C. Highway #380 to Second Mill Pond Dam, *Class A*. That portion from Second Mill Pond Dam to its confluence with the Pocotaligo River, *Class B*. Filed December 22, 1972.

GULLEY BRANCH: Florence County. The entire stream tributary to Jefferies Creek, *Class A*. Filed June 8, 1956.

HAILE GOLD MINE BRANCH: Lancaster County. See Branch from Haile Gold Mine in (Lancaster County).

HALFMOON BRANCH: Bamberg County. The entire stream tributary to Ghents Branch, *Class B*. Filed August 7, 1972.

HAMLIN SOUND: Charleston County. The entire sound, *Class SA*. Filed March 15, 1968.

HANGING ROCK CREEK: Lancaster and Kershaw Counties. That portion from the headquarters to County Road 84 below Kershaw, *Class B*. Filed October 6, 1966.

HARBOR RIVER: Beaufort County. The entire stream tributary to St. Helena Sound and Fripp Inlet, *Class SA*. Filed November 5, 1955.

HARD LABOR CREEK: Greenwood and McCormick Counties. The entire stream tributary to Stevens Creek, *Class B*. Filed August 7, 1972.

HARRIS MILL BRANCH: Greenwood County. The entire system tributary to Rocky Creek, *Class B*. Filed August 7, 1972.

HARTWELL RESERVOIR: Oconee, Pickens and Anderson Counties. All that portion within South Carolina, *Class A*. Filed April 4, 1960.

HAWE CREEK: McCormick County. The entire stream tributary to Clark Hill Reservoir, *Class B*. Filed August 7, 1972.

HAYES SWAMP: Dillon County. The entire stream tributary to Little Pee Dee River, *Class B (swamp)*. Filed August 7, 1972.

HELLHOLE CREEK: Lexington County. The entire stream tributary to Lightwood Knot Creek, *Class A*. Filed October 14, 1955.

HEMBREE CREEK: Anderson County. The entire system tributary to Hartwell Reservoir, *Class B*. Filed August 7, 1972.

HEMEDY CREEK (Ramsey Creek): Oconee County. The entire stream tributary to Chauga River, *Class B*. Filed May 24, 1954.

HEN COOP CREEK: Anderson County. The entire stream tributary to Rocky River, *Class B*. Filed August 7, 1972.

HOLLOW CREEK: Lexington County. The entire stream tributary to Lake Murray, *Class A*. Filed December 9, 1968.

HORSE CREEK: Aiken County. That portion above Flat Rock Pond, *Class A*. Filed November 25, 1957; from Flat Rock Pond to Savannah River, *Class B*. Filed August 7, 1972.

HUSBANDS CREEK: Marlboro County. The entire stream tributary to Pee Dee River, *Class B*. Filed August 7, 1972.

INDIAN CREEK: Laurens County. The entire stream tributary to Enoree River, *Class B*. Filed August 7, 1972.

INDIAN FIELD SWAMP: Dorchester and Orangeburg Counties. The entire stream tributary to Polk Swamp, *Class B (swamp)*. Filed February 16, 1956.

INTRACOASTAL WATERWAY: Horry and Georgetown Counties. From the North Carolina line to salt water intrusion, *Class A*; from salt water intrusion to Winyah Bay, *Class SA*. Filed June 8, 1956; from Winyah Bay to South Santee River, *Class SB*. Filed March 15, 1968.

INTRACOASTAL WATERWAY: Charleston County. That portion of the waterway from South Edisto River to S.C.L. Railroad Bridge over Stono River, *Class SA*. From the S.C.L. Bridge over Stono River through Charleston Harbor to Ben Sawyer Bridge, *Class SC*. From Ben Sawyer Bridge to South Santee River, *Class SA*. Filed March 15, 1968.

IRENE CREEK: Cherokee County. See Beaverdam Creek in (Cherokee County).

JACKSON BRANCH: Allendale and Hampton Counties. The entire stream tributary to Whippy Swamp, *Class A*. Filed November 5, 1955.

JACKSON CREEK: Fairfield County. The entire stream tributary to Little River, *Class A*. Filed June 27, 1968.

JACKSON CREEK: Richland County. The entire stream tributary to Gills Creek, *Class A*. Filed February 17, 1954.

JACOBS CREEK: Laurens County. The entire stream tributary to Sand Creek, *Class B*. Filed August 7, 1972.

JEFFRIES CREEK: Darlington and Florence Counties. From the headwaters to Claussen Crossroads (S.C. 327), *Class B (swamp)*. From S.C. 327 to Pee Dee River, *Class A (swamp)*. Filed June 8, 1956.

JERICO CREEK: Beaufort County. The entire stream tributary to Battery Creek, *Class SB*. Filed March 15, 1968.

JERRY CREEK (also called Chauga Creek): Oconee County. See Chauga Creek in (Oconee County).

JIMMIES CREEK: Spartanburg County. The entire stream tributary to Tyger River, *Class B*. Filed August 7, 1972.

JOHNSONS SWAMP (Summerhouse Branch and Bartons Branch): Williamsburg and Georgetown Counties. The entire stream tributary to Black River, *Class B*. Filed August 7, 1972.

JORDAN BRANCH: Barnwell County. The entire stream tributary to Toby Creek, *Class B*. Filed August 7, 1972.

KATE FOWLER BRANCH: Greenwood County. The entire stream tributary to Ninety-six Creek, *Class B*. Filed August 7, 1972.

KELLERS CREEK: Abbeville County. The entire stream tributary to McCord Creek, *Class B*. Filed March 24, 1955.

KELSEY CREEK: Spartanburg County. The entire stream tributary to Fairforest Creek, *Class B*. Filed April 21, 1970.

KEOWEE LAKE: Oconee and Picken Counties. The entire lake *Class A*. Filed September 7, 1971.

KILGORE BRANCH: Darlington County. The entire stream tributary to Black Creek, *Class A*. Filed August 7, 1972.

KINGS CREEK: Newberry County. The entire stream tributary to Enoree River, *Class B*. Filed October 14, 1955.

LAKE GREENWOOD: Greenwood, Laurens, Newberry Counties. The entire lake on Saluda River, *Class A*. Filed November 26, 1963.

LAKE LANIER: Greenville County. The entire lake on Vaughn Creek, *Class A*. Filed January 24, 1972.

LAKE MARION: Berkeley, Clarendon, Sumter and Orangeburg Counties. The entire Lake, *Class A*. Filed March 15, 1968.

LAKE MOULTRIE: Berkeley County. The entire lake, *Class A*. Filed March 15, 1968.

LAKE MURRAY: Newberry, Lexington, Saluda and Richland Counties. The entire lake on Saluda River, *Class A*. Filed September 7, 1971.

LAKE SWAMP (Lake City, also called Lynches Lake): Florence and Williamsburg Counties. That portion to the developed swimming area, *Class A (swamp)*. Filed June 8, 1956. From the developed swimming area to Lynches River, *Class B (swamp)*. Filed August 7, 1972.

LAKE SWAMP: Darlington and Florence Counties. The entire stream tributary to Sparrow Swamp, *Class B (swamp)*. Filed August 7, 1972.

LAKE WYLIE: York County. The entire lake on Catawba River, *Class A*. Filed September 7, 1971.

LANGSTON CREEK (formerly Unnamed Creek which enters Reedy River 1-1/2 miles above Long Branch): Greenville County. The entire stream tributary to Reedy River, *Class B*. Filed August 7, 1972.

LAUREL CREEK: Greenville County. The entire stream tributary to Reedy River, *Class B*. Filed November 7, 1956.

LAWSONS FORK CREEK: Spartanburg County. The entire stream tributary to Pacolet River, *Class B*. Filed August 7, 1972.

LEMON CREEK: Bamberg County. The entire stream tributary to Little Salkahatchie River, *Class B (swamp)*. Filed August 7, 1972.

LIGHTWOOD KNOT CREEK: Lexington County. The entire stream tributary to North Fork Edisto River, *Class A*. Filed October 14, 1955.

LIMESTONE CREEK: Cherokee County. The entire stream tributary to Broad River, *Class B*. Filed August 7, 1972.

LITTLE BOGGY SWAMP: Darlington County. The entire stream tributary to Big Boggy Swamp, *Class A*. Filed August 7, 1972.

LITTLE FORK CREEK: Chesterfield County. See West Fork in (Chesterfield County).

LITTLE GENEROSTEE CREEK: Anderson County. The entire stream tributary to Savannah River, *Class B*. Filed August 7, 1972.

LITTLE HORSE CREEK: Aiken County. That portion above Clearwater Dam, *Class A*. Filed November 25, 1957. From Clearwater Dam to Horse Creek, *Class B*. Filed August 7, 1972.

LITTLE LYNCHES RIVER (also called Lynch Creek): Lancaster and Kershaw Counties. The entire stream tributary to Lynch River, *Class B*. Filed November 24, 1953; June 8, 1956 and August 7, 1972.

LITTLE PEE DEE RIVER: Marlboro, Dillon, Marion and Horry Counties. That portion of the stream from its headwaters to Ropers Mill Branch, *Class A*. Filed August 7, 1954. From Ropers Mill Branch to S.C. 41, *Class B*. Filed August 7, 1972. From S.C. 41 to Lumber River, *Class B*. Filed June 8, 1956. From Lumber River to the confluence with the Pee Dee River, *Class A*. Filed June 8, 1956.

LITTLE PINE TREE CREEK: Kershaw County. That portion of the stream above Wateree Mill Pond, *Class A*. Filed January 18, 1957. From Wateree Mill Pond to Big Pine Tree Creek, *Class B*. Filed August 7, 1972.

LITTLE RIVER: Abbeville and McCormick Counties. The entire stream tributary to Clark Hill Reservoir, *Class B*. Filed March 24, 1955; May 26, 1955 and August 7, 1972.

LITTLE RIVER: Fairfield County. The entire stream tributary to Broad River, *Class B*. Filed January 21, 1954 and August 7, 1972.

LITTLE RIVER: Laurens and Newberry Counties. The entire stream tributary to Saluda River, *Class B*. Filed October 14, 1955 and August 7, 1972.

LITTLE RIVER: Oconee County. Entire stream tributary to Lake Hartwell, *Class B*. Filed August 1, 1955.

LITTLE SALKEHATCHIE RIVER: Bamberg and Colleton Counties. The entire stream in Bamberg County, *Class B*. Filed August 7, 1972. The entire stream in Colleton County tributary to Salkehatchie River, *Class A*. Filed November 5, 1955.

LITTLE SALUDA RIVER: Saluda County. The entire stream tributary to Lake Murray, *Class B*. Filed August 7, 1972.

LITTLE SANDY RIVER: Chester County. The entire stream tributary to Sandy River, *Class A*. Filed January 22, 1959.

LITTLE THICKETTY CREEK: Cherokee County. The entire stream tributary to Thicketty Creek, *Class B*. Filed August 7, 1972.

LONG CANE CREEK: Abbeville and McCormick Counties. The entire stream tributary to Clark Hill Reservoir, *Class B*. Filed March 24, 1955; May 26, 1955 and August 7, 1972.

LUDLOW BRANCH: McCormick County. The entire stream tributary to Clark Hill Reservoir, *Class B*. Filed August 7, 1972.

LUMBER RIVER: Marion, Dillon and Horry Counties. The entire stream tributary to Little Pee Dee River, *Class A*. Filed June 8, 1956.

LYNCHES LAKE: Florence and Williamsburg Counties. See Lake Swamp in (Florence and Williamsburg Counties).

LYNCHES RIVER: Chesterfield, Lee, Lancaster, Kershaw, Darlington, Sumter and Florence Counties.

The entire stream tributary to Pee Dee River, *Class B*. Filed July 12, 1963 and August 7, 1972.

MAD DOG BRANCH: Pickens County. The entire stream tributary to Georges Creek, *Class B*. Filed June 28, 1954.

MAPLE CREEK: Spartanburg County. The entire stream tributary to South Tyger River, *Class B*. Filed August 7, 1972.

MAPLE SWAMP: Dillon County. The entire stream tributary to Little Pee Dee River, *Class B (swamp)*. Filed August 7, 1972.

MARTIN CREEK: Oconee County. The entire stream tributary to Hartwell Reservoir, *Class B*. Filed August 7, 1972.

MAY RIVER: Beaufort County. The entire stream tributary to Calibogue Sound, *Class SA*. Filed November 5, 1955.

MEINGS CREEK (also called Meng Creek): Union County. The entire stream tributary to Broad River, *Class B*. Filed February 24, 1953 and August 7, 1972.

MIDDLE TYGER RIVER: Spartanburg and Greenville Counties. The entire stream tributary to North Tyger River, *Class B*. Filed August 7, 1972.

MILL BRANCH: Orangeburg County. The entire stream tributary to North Fork Edisto River, *Class B*. Filed February 16, 1956.

MILL CREEK: Cherokee County. The entire stream tributary to Limestone Creek, *Class B*. Filed August 7, 1972.

MILL CREEK: Fairfield County. Headwaters to Winnsboro intake, *Class A*. Filed April 8, 1968. From Winnsboro intake to Little River, *Class B*. Filed August 7, 1972.

MILL CREEK: Richland County. The entire stream tributary to Congaree River, *Class A*. Filed February 17, 1954.

MILL CREEK: Spartanburg County. The entire stream tributary to Enoree River, *Class B*. Filed August 7, 1972.

MILL CREEK: Sumter County. The entire stream tributary to Lake Marion, *Class A*. Filed January 24, 1972.

MINE CREEK: Saluda County. The entire stream tributary to Little Saluda River, *Class B*. Filed October 14, 1955.

MITCHEL CREEK: Union County. The entire stream tributary to Fairforest Creek, *Class B*. Filed August 7, 1972.

MORGAN RIVER: Beaufort County. The entire stream tributary to St. Helena Sound, *Class SA*. Filed November 5, 1955.

MUD CREEK: Jasper County. The entire stream between Savannah River and Wright River, *Class SB*. Filed March 15, 1968.

MUDDY CREEK: Williamsburg and Florence Counties. The entire stream tributary to Clarks Creek, *Class B (swamp)*. Filed August 7, 1972.

MURRELLS INLET: Georgetown County. The entire inlet tributary to Atlantic Ocean, *Class SA*. Filed March 15, 1968.

MCALPINE CREEK: Lancaster County. The entire stream tributary to Sugar Creek, *Class B*. Filed August 7, 1972.

MCCORD CREEK: Abbeville County. The entire stream tributary to Long Cane Creek, *Class B*. Filed March 24, 1955.

MCINTOSH MILL STREAM: Darlington County. The entire stream tributary to Black Creek, *Class A*. Filed August 7, 1972.

NAKED CREEK: Marlboro County. The entire stream tributary to Pee Dee River, *Class A*. Filed June 8, 1956.

NEW CHEHAW RIVER: Colleton County. The entire stream tributary to St. Helena Sound, *Class SA*. Filed March 15, 1968.

NEWMAN SWAMP: Darlington County. The entire stream tributary to Sparrow Swamp, *Class B (swamp)*. Filed August 7, 1972.

NEW RIVER: Beaufort and Jasper Counties. The entire stream tributary to Atlantic Ocean, *Class SB*. Filed November 5, 1955.

NINETY SIX CREEK: Greenwood County. The entire stream tributary to Wilson Creek, *Class B*. Filed October 5, 1953 and August 7, 1972.

NORRIS CREEK: Abbeville County. The entire stream tributary to Long Cane Creek, *Class B*. Filed August 7, 1972.

NORTH FORK CHATOOGA RIVER: Oconee County. From North Carolina State Line to its junction with South Fork Chatooga River, *Class A*. Filed March 15, 1968.

NORTH FORK EDISTO RIVER: Orangeburg, Lexington and Aiken Counties. From its headwaters to the Orangeburg discharge, *Class A*. Filed July 13, 1956. From the Orangeburg discharge to Edisto River, *Class B*. Filed August 7, 1972.

NORTH EDISTO: Charleston County. The entire stream tributary to Atlantic Ocean, *Class SA*. Filed February 16, 1956.

NORTH PACOLET RIVER: Spartanburg County. The entire stream tributary to Pacolet River, *Class B*. Filed August 7, 1972.

NORTH SALUDA RIVER: Greenville County. That portion from its headwaters to S.C. 42, *Class AA*. Filed September 16, 1956. From S.C. 42 to Saluda River, *Class B*. Filed December 9, 1968.

NORTH SANTEE RIVER: Georgetown County. That fresh water portion of the stream, *Class B*. Filed August 7, 1972. From U.S. 17 to 1000 feet below the Intracoastal Waterway, *Class SB*. From that point to the Atlantic Ocean, *Class SA*. Filed February 15, 1962.

NORTH TYGER RIVER: Spartanburg County. The entire stream tributary to Tyger River, *Class B*. Filed August 7, 1972.

OLD CHEHAW RIVER: Colleton County. The entire stream tributary to Combahee River, *Class SA*. Filed March 15, 1968.

OLIVE BRANCH: Lexington County. The entire stream tributary to Duncan Creek, *Class B*. Filed August 7, 1972.

PACOLET RIVER: Spartanburg, Union and Cherokee Counties. The entire stream tributary to Broad

River, *Class B*. Filed January 26, 1972 and August 7, 1972.

PANTHER CREEK: Marlboro County. The entire stream tributary to Beaverdam Creek, *Class B*. Filed June 8, 1956.

PARK CREEK: Abbeville County. The entire stream tributary to Little Pee Dee River, *Class B*. Filed August 7, 1972.

PEE DEE RIVER: Chesterfield, Dillon, Marlboro, Darlington and Florence Counties. The entire stream tributary to Winyah Bay, *Class B*. Filed May 26, 1953 and August 7, 1972.

PEN BRANCH: Orangeburg County. The entire stream tributary to the North Fork Edisto River, *Class B*. Filed August 7, 1972.

PEOPLES CREEK (also known as Gaffney Creek and Town Creek): Cherokee County. The entire stream tributary to Broad River, *Class B*. Filed August 7, 1972.

PLEASANT MEADOW SWAMP: Horry County. The entire stream tributary to Lake Swamp, *Class B (swamp)*. Filed August 7, 1972.

POCOTALIGO RIVER: Sumter and Clarendon Counties. The entire stream tributary to Black River, *Class B (swamp)*. Filed June 8, 1956.

POLK SWAMP: Dorchester and Orangeburg Counties. The entire stream tributary to Edisto River, *Class B (swamp)*. Filed February 16, 1956.

PORT ROYAL SOUND: Beaufort County. The entire sound tributary to Atlantic Ocean, *Class SA*. Filed November 5, 1955.

PROVIDENCE CREEK: Cherokee County. That portion of the stream below County Road 793 to Cherokee Creek, *Class B*. Filed January 24, 1964.

PYE BRANCH: Florence County. The entire stream tributary to Jeffries Creek, *Class B*. Filed August 7, 1972.

RABON CREEK: Laurens County. The entire stream tributary to Lake Greenwood, *Class B*. Filed March 31, 1954.

RAMSEY CREEK (Hemedy Creek): Oconee County. See Hemedy Creek in (Oconee County).

RAMSHORN CREEK: Beaufort County. The entire stream between New River and Cooper River, *Class SA*. Filed November 5, 1955.

RED BANK CREEK: Lexington County. The entire stream tributary to Congaree Creek, *Class A*. Filed October 14, 1955.

RED BANK CREEK: Saluda County. The entire stream tributary to Mine Creek, *Class B*. Filed October 14, 1955 and August 7, 1972.

REEDY FORK BRANCH: Laurens County. The entire stream tributary to Little River, *Class B*. Filed March 31, 1954 and August 7, 1972.

REEDY RIVER: Greenville and Laurens Counties. The entire stream tributary to Lake Greenwood, *Class B*. Filed August 7, 1972.

RICES CREEK: Pickens County. The entire stream tributary to Twelve Mile Creek, *Class B*. Filed August 7, 1972.

RICHARDSON BRANCH: Allendale County. The entire stream tributary to Coosawhatchie River, *Class B*. Filed August 7, 1972.

ROCKY CREEK (Cedar Creek Lake): Chester, Fairfield and Lancaster Counties. The entire lake on Catawba River, *Class A*. Filed September 7, 1971.

ROCKY CREEK (also called Rock Creek): Greenwood County. The entire stream tributary to Coronaca Creek, *Class B*. Filed August 7, 1972.

ROCKY CREEK: McCormick County. The entire stream tributary to Hard Labor Creek, *Class B*. Filed May 26, 1955 and August 7, 1972.

ROCKY RIVER: Anderson and Abbeville Counties. The entire stream tributary to Savannah River, *Class B*. Filed January 27, 1956 and August 7, 1972.

ROSEMARY CREEK: Barnwell County. The entire stream tributary to Salkehatchie River, *Class B*. Filed August 7, 1972.

SAINT HELENA SOUND: Beaufort and Colleton Counties. The entire sound tributary to Atlantic Ocean, *Class SA*. Filed March 15, 1968.

SALKEHATCHIE-COMBAHEE RIVER: Barnwell, Bamberg, Allendale, Colleton, Hampton and Beaufort Counties. From headwaters to salt water intrusion, *Class A*. From salt water intrusion to St. Helena Sound, *Class SA*. Filed November 5, 1955.

SALT WATER CREEK (Fields Cut): Jasper County. See Field Cut in (Jasper County).

SALUDA RIVER (Main Stem): From headwaters to Lake Murray, *Class B*; from Lake Murray Dam to confluence of Saluda River and Broad River, *Class A*. Filed October 26, 1977.

SALUDA LAKE: Greenville County. The entire lake on Saluda River, *Class A*. Filed January 24, 1972.

SAMPIT RIVER: Georgetown County. From the headwaters to salt water intrusion, *Class B (swamp)*. Filed August 7, 1972. From salt water intrusion to Winyah Bay, *Class SC*. Filed June 8, 1956.

SAND CREEK: Fairfield County. The entire stream tributary to Jackson Creek, *Class A*. Filed April 8, 1968.

SAND CREEK: Laurens County. The entire stream tributary to Duncan Creek, *Class B*. Filed August 7, 1972.

SANDERS CREEK: Kershaw County. The entire stream tributary to Wateree River, *Class A*. Filed January 18, 1957.

SANDERS BRANCH: Hampton County. The entire stream tributary to Coosawhatchie River, *Class B (swamp)*. Filed August 7, 1972.

SANDY RIVER: Chester County. From its headwaters through the Chester Reservoir, *Class A*. Filed January 22, 1959. From the Chester Reservoir to a point 100 yards above Bear Creek, *Class B*. Filed August 7, 1972. From this point to Broad River, *Class A*. Filed January 22, 1959.

SANTEE RIVER (North & South): Berkeley, Charleston and Georgetown Counties. See North Santee River and South Santee River in (Berkeley, Charleston and Georgetown Counties).

SANTEE RIVER: Clarendon, Berkeley, Williamsburg and Georgetown Counties. That portion of the stream below Lake Marion to the North and South Santee Rivers, *Class B*. Filed August 7, 1972.

SANTEE RIVER: Calhoun and Sumter Counties. From junction of Congaree and Wateree Rivers to Lake Marion, *Class A*. Filed March 15, 1968.

SAVANNAH CREEK: Bamberg and Colleton Counties. The entire stream tributary to Salkehatchie River, *Class B*. Filed August 7, 1972.

SAVANNAH RIVER: Abbeville, Allendale, Anderson, McCormick, Edgefield, Barnwell, Hampton, Aiken and Jasper Counties. From Lake Hartwell through Clark Hill Lake, *Class A*. Filed March 15, 1968. From Clark Hill Dam to Ft. Pulaski, *Class B*. Filed March 15, 1968 and August 7, 1972. From Ft. Pulaski to Atlantic Ocean, *Class A*. Filed March 15, 1968.

SAWMILL BRANCH: Dorchester and Berkeley Counties. The entire stream tributary to Dorchester Creek, *Class B*. Filed August 7, 1972.

SAWNEY CREEK: Abbeville and McCormick Counties. The entire stream tributary to Little River, *Class B*. Filed August 7, 1972.

SAWNEYS CREEK: Fairfield and Kershaw Counties. The entire stream tributary to Wateree River, *Class B*. Filed August 7, 1972.

SCHEWBOUGH BRANCH (also called Skeebo Branch): Horry County. The entire stream tributary to the North Carolina Line, *Class B (swamp)*. Filed August 7, 1972.

SCOTT CREEK: Newberry County. The entire stream tributary to Bush River, *Class B*. Filed August 7, 1972.

SCOUTER CREEK: Lexington County. The entire stream tributary to Congaree Creek, *Class A*. Filed October 14, 1955.

SECOND CREEK: Lexington County. The entire stream tributary to First Creek, *Class A*. Filed October 14, 1955.

SHANKLIN CREEK: Anderson County. The entire stream tributary to Three and Twenty Mile Creek, *Class B*. Filed August 7, 1972.

SHAYER CREEK (also called Cheves Creek): Edgefield County. From its headwaters to Georgia and Florida Railroad, *Class A*. From the Railroad to its junction with Stevens Creek, *Class B*. Filed July 7, 1955.

SHAW CREEK: Aiken and Edgefield Counties. The entire stream tributary to South Fork Edisto River, *Class A*. Filed July 7, 1955 and February 16, 1956.

SHELL CREEK: Laurens County. The entire stream tributary to Bush River, *Class B*. Filed August 7, 1972.

SHEM CREEK: Charleston County. The entire stream tributary to Charleston Harbor, *Class SC*. Filed March 15, 1968.

SILVER BROOK CREEK: Anderson County. See Cemetery Creek in (Anderson County).

SIX MILE CREEK: Lexington County. The entire stream tributary to Congaree Creek, *Class B*. Filed August 7, 1972.

SKEEBO BRANCH: Horry County. See Schewbough Branch in (Horry County).

SMITH BRANCH: Richland County. The entire stream tributary to Broad River, *Class B*. Filed August 7, 1972.

SOUTH EDISTO RIVER: Charleston and Colleton Counties. The entire stream tributary to Atlantic Ocean, *Class SA*. Filed February 16, 1956.

SOUTH FORK EDISTO: Edgefield, Aiken, Barnwell, Orangeburg and Bamberg Counties. That portion from its headwaters to U.S. 1, *Class B*. From U.S. 1 to 3/4 mile above S.C.L. Railroad, *Class A*. Filed July 13, 1956. From 3/4 mile above the Railroad to its junction with North Fork Edisto River, *Class B*. Filed January 20, 1960.

SOUTH PACOLET RIVER: Spartanburg County. The entire stream tributary to Pacolet River, *Class B*. Filed April 7, 1953.

SOUTH SALUDA RIVER: Greenville County. That portion from its headwaters through Table Rock Cove, *Class AA*. From the Cove to the junction with North Saluda River, *Class B*. Filed April 17, 1953.

SOUTH SANTEE RIVER: Georgetown, Berkeley and Charleston Counties. That fresh water portion, *Class B*. Filed August 7, 1972. From U.S. 17 to 1000 feet below the Intracoastal Waterway, *Class SB*. From that point to the Atlantic Ocean, *Class SA*. Filed February 15, 1962.

SOUTH TYGER RIVER: Spartanburg and Greenville Counties. The entire stream tributary to Tyger River, *Class B*. Filed April 7, 1953 and August 7, 1972.

SPAIN CREEK: Greenville County. The entire stream tributary to Saluda River, *Class B*. Filed August 7, 1972.

SPARROW SWAMP: Lee, Darlington and Florence Counties. The entire stream tributary to Lynches River, *Class B (swamp)*. Filed August 7, 1972.

STEEL CREEK: York County. The entire stream tributary to Sugar Creek, *Class B*. Filed August 7, 1972.

STEVENS CREEK: McCormick and Edgefield Counties. The entire stream tributary to Savannah River, *Class B*. Filed August 7, 1972.

STITT BRANCH: Fairfield County. The entire stream tributary to Jackson Creek, *Class A*. Filed April 8, 1968.

STONO RIVER: Charleston County. That portion extending eastward to S.C.L. Railroad bridge, *Class SA*. From the S.C.L. bridge to Abbapoola Creek, *Class SC*. From Abbapoola Creek to Folly River, *Class SA*. Filed March 15, 1968.

STUART CREEK: Fairfield County. The entire stream tributary to Jackson Creek, *Class B*. Filed January 21, 1954 and August 7, 1972.

SUGAR CREEK: York and Lancaster Counties. The entire stream tributary to Catawba River, *Class B*. Filed August 7, 1972.

SUMMERHOUSE BRANCH (Bartons Swamp and Johnsons Swamp): Williamsburg and Georgetown Counties. See Bartons Swamp and Johnsons Swamp in (Williamsburg and Georgetown Counties).

SWAMP (near North, S.C.): Orangeburg County. The entire stream tributary to North Fork Edisto River, *Class B (swamp)*. Filed August 7, 1972.

SWEETWATER BRANCH: Edgefield County. The entire stream tributary to Stevens Creek, *Class A*. Filed December 12, 1966.

SWIFT CREEK: Kershaw and Sumter Counties. The entire stream tributary to Wateree River, *Class A*. Filed January 18, 1957.

TAILRACE CANAL: Berkeley County. From Lake Moultrie power plant to Moncks Corner, *Class A*. Filed March 15, 1968.

THICKETTY CREEK: Cherokee County. That portion of the stream below the Cowpens discharge tributary to Broad River, *Class B*. Filed August 7, 1972.

THOMPSON CREEK: Chesterfield County. The entire stream tributary to Pee Dee River, *Class B*. Filed June 8, 1956 and August 7, 1972.

THREE CREEKS: Marlboro County. The entire stream tributary to Pee Dee River, *Class A*. Filed June 8, 1956.

TIMOTHY CREEK: Newberry County. The entire stream tributary to Bush River, *Class B*. Filed August 7, 1972.

TINKER CREEK: Union County. The entire stream tributary to Tyger River, *Class B*. Filed August 7, 1972.

TINKERS CREEK: Chester County. The entire stream tributary to Fishing Creek, *Class A*. Filed January 22, 1959.

TOBY CREEK: Barnwell County. The entire stream tributary to Salkehatchie River, *Class B*. Filed August 7, 1972.

TODDS BRANCH: Lancaster County. The entire stream tributary to Little Lynches River, *Class B*. Filed August 7, 1972.

TOMS CREEK: Lexington County. The entire stream tributary to Congaree River, *Class A*. Filed October 14, 1955.

TOWN CREEK: Cherokee County. See Peoples Creek in (Cherokee County).

TOWN CREEK: Kershaw County. The entire stream tributary to Wateree River, *Class B*. Filed August 7, 1972.

TOWN CREEK: Pickens County. The entire stream tributary to Twelve Mile Creek, *Class B*. Filed June 28, 1954 and August 7, 1972.

TRENCHARDS INLET: Beaufort County. The entire inlet tributary to Atlantic Ocean, *Class SA*. Filed November 5, 1955.

TUGALOO RIVER: Oconee County. From Tugaloo Dam to Lake Hartwell, *Class A*. Filed March 15, 1968.

TURKEY CREEK: Barnwell County. That portion through Fuller Park, *Class A*. Filed November 5, 1955. From Fuller Park to Salkehatchie River, *Class B*. Filed August 7, 1972.

TURKEY CREEK: Chester and York Counties. The entire stream tributary to Broad River, *Class B*. Filed November 3, 1953 and August 7, 1972.

TURKEY CREEK: Edgefield and McCormick Counties. The entire stream tributary to Stevens Creek, *Class B*. Filed July 7, 1955 and August 7, 1972.

TURKEY CREEK: Greenwood County. The entire stream tributary to Saluda River, *Class B*. Filed August 7, 1972.

TURKEY CREEK: Lancaster County. The entire stream tributary to Cane Creek, *Class B*. Filed November 24, 1953 and August 7, 1972.

TURKEY CREEK (also called Turkey Quarter Creek): Lancaster County. The entire stream tributary to Cane Creek, *Class B*. Filed November 24, 1953, and August 7, 1972.

TWELVE MILE CREEK: Lexington County. That portion from its headwaters to S.C. 6, *Class A*. Filed October 14, 1955. From S.C. 6 to Saluda River, *Class B*. Filed August 7, 1972.

TWELVE MILE CREEK: Pickens County. The entire stream tributary to Lake Hartwell, *Class B*. Filed October 14, 1955.

TWENTY-FIVE MILE CREEK: Kershaw County. The entire stream tributary to Wateree River, *Class A*. Filed January 18, 1957.

TWENTY-SIX MILE CREEK: Anderson County. The entire stream tributary to Lake Hartwell, *Class B*. Filed June 29, 1953.

TWENTY-THREE MILE CREEK: Anderson County. The entire stream tributary to Lake Hartwell, *Class B*. Filed June 29, 1953 and August 7, 1972.

TYGER RIVER (Main Stream): Spartanburg, Union and Newberry Counties. The entire stream tributary to Broad River, *Class B*. Filed August 7, 1972.

UNNAMED CREEK: Greenville County. The Un-named Creek which enters Reedy River on the west bank 1 1/4 miles below Conestee Lake, *Class B*. Filed August 7, 1972.

UNNAMED CREEK: Greenville County. See Langston Creek in (Greenville County).

UNNAMED CREEK: Oconee County. Which enters Little River at Newry, *Class B*. Filed May 24, 1954.

UNNAMED CREEK: Union County. Which originates in Jonesville and flows north-northeast to Mill Creek, *Class B*. Filed August 7, 1972.

VAUGHN'S CREEK: Greenville County. The entire stream tributary to Lake Lanier, *Class A.A*. Filed April 7, 1953.

WACCAMAW RIVER: Horry and Georgetown Counties. That portion from headwaters to Conway discharge, *Class A (swamp)*. Filed June 8, 1956. From the Conway discharge to Winyah Bay, *Class A*. Filed March 15, 1968.

WADMALAW RIVER: Charleston County. The entire stream tributary to North Edisto River, *Class SA*. Filed March 15, 1968.

WADMALAW SOUND: Charleston County. The entire sound tributary to Wadmalaw River, *Class SA*. Filed March 15, 1968.

WALKER BRANCH: Fairfield County. The entire stream tributary to Dutchmans Creek, *Class B*. Filed August 7, 1972.

WANDO RIVER: Charleston and Berkeley Counties. The entire stream tributary to Cooper River at Charleston Harbor, *Class SB*. Filed March 15, 1968.

WAPPOO CREEK: Charleston County. The entire stream tributary to Stono River, *Class SC*. Filed March 15, 1968.

WARRIOR CREEK: Laurens County. The entire stream tributary to Enoree River, *Class B*. Filed August 7, 1972.

WATEREE LAKE: Fairfield, Kershaw and Lancaster Counties. The entire lake on Catawba-Wateree River, *Class A*. Filed September 7, 1972.

WATTS MILL BRANCH: Laurens County. The entire stream tributary to Little River, *Class B*. Filed August 7, 1972.

WEST FORK (also called Little Fork Creek): Chesterfield County. The entire stream tributary to East Fork or Fork Creek, *Class B*. Filed August 7, 1972.

WHALE BRANCH: Beaufort County. The entire stream between Broad River and Coosaw River, *Class SA*. Filed November 5, 1955.

WHITE OAK CREEK: Kershaw County. The entire stream tributary to Wateree Lake, *Class A*. Filed January 18, 1957.

WHITE OAK CREEK: Marion County. The entire stream tributary to Pee Dee River Swamp, *Class B (swamp)*. Filed August 7, 1972.

WHITNER CREEK: Anderson County. The entire stream tributary to Big Generostee Creek, *Class B*. Filed August 7, 1972.

WILDCAT CREEK: Richland County. The entire stream tributary to Gills Creek, *Class A*. Filed February 17, 1954.

WILDCAT CREEK: York County. The entire stream tributary to Fishing Creek, *Class B*. Filed August 7, 1972.

WILKERSON CREEK: Aiken County. From its headwaters to the Aiken discharge, *Class A*. Filed November 25, 1957. From the Aiken discharge to Horse Creek, *Class B*. Filed August 7, 1972.

WILSON CREEK: Anderson and Abbeville Counties. The entire stream tributary to Rocky River, *Class B*. Filed August 7, 1972.

WILSON CREEK: Greenville County. The entire stream tributary to Durbin Creek, *Class B*. Filed August 7, 1972.

WILSON CREEK: Greenwood County. The entire stream tributary to Saluda River, *Class B*. Filed August 7, 1972.

WINDY HILL CREEK: Barnwell and Bamberg Counties. The entire stream tributary to South Fork Edisto River, *Class B*. Filed February 16, 1956.

WINYAH BAY: Georgetown County. The entire bay tributary to Atlantic Ocean, *Class SC*. Filed June 8, 1956.

WOLF CREEK: Pickens County. The entire stream tributary to Twelve Mile Creek, *Class B*. Filed August 7, 1972.

WRIGHT RIVER: Jasper County. The entire stream tributary to Atlantic Ocean, *Class SB*. Filed November 5, 1955.

ZEKIAL CREEK: Cherokee County. From headwaters to its intersection with S.C. Highway #110, *Class B*. Filed March 8, 1966.

APPENDIX F
FACILITY DESCRIPTIONS

APPENDIX F
FACILITY DESCRIPTIONS

INDUSTRIAL OPERATIONS (SHOPS)

Hospital Lab, Building 114.

This lab performs medical testing to aid patient diagnosis.

Medical X-Ray Lab, Building 114.

Personnel for this lab perform routine patient X-rays, process X-ray film and develop X-rays.

Hospital Operating Room, Building 114.

This facility performs medical operations for patient treatment.

Photo Lab, Building 502.

This lab is responsible for black and white, color transparency and portrait photography in support of base activities.

Fuels Lab, Building 518.

This facility provides quality control analysis for fuels and fuel products.

Battery Shop, Building 514.

Personnel from this shop are responsible for the maintenance of the batteries for the motor pool.

General Transportation Maintenance, Building 514.

This shop is responsible for maintaining the motor pool vehicles.

Paint Shop, Building 514.

This facility maintains transportation equipment with proper painting facilities.

Refueling Maintenance, Building 516.

This shop is responsible for repairing and maintaining all aircraft refueling vehicles.

Welding Shop, Building 514.

This shop is responsible for all welding work associated with transportation motor pool section.

Small Arms Range, Building 544.

This facility is used for small arms training.

Auto Hobby Shop, Building 255.

This shop is used by base personnel for minor personal automotive repair and maintenance.

Radar Maintenance, Building 364.

This facility is used to repair and maintain radar equipment.

Entomology Shop, Building 562/220.

This shop and accompanying material storage facility (Building 562) stores, mixes and applies herbicides and pesticides for the base.

Heating Shop, Building 220.

This shop is responsible for the operation, maintenance and repair of all base heating systems.

Liquid Fuels/Maintenance Shop, Building 220.

Personnel from this shop inspect, clean and maintain all fuel storage tanks.

Paint Shop, Building 217.

This shop performs exterior and interior painting on all buildings and facilities base-wide. This facility applies reflective coatings to traffic and air field signs.

Pavement and Grounds Shop, Building 220.

This facility is responsible for constructing, maintaining and repairing all air field pavements, roads, curbs, walks, subgrades and drainage structures. Also, this shop performs erosion and weed control as well as all phases of ground maintenance.

Plumbing Shop, Building 220.

This facility maintains all water and drain lines for the base. Its responsibilities include drinking water, sewage and fire lines.

Power Production, Building 220.

Personnel from this shop install, operate and maintain all base electrical systems.

Refrigeration Shop, Building 220.

This facility installs, maintains, repairs and operates all refrigeration and air conditioning equipment on base.

Structural Maintenance, Building 221.

This shop accomplishes all base-wide carpentry and masonry work.

Welding Shop, Building 221.

This facility performs welding and sheet metal maintenance.

Aero Repair Shop, Building 352.

This shop is responsible for the repair and reclamation of aircraft and parts that have been damaged. The tasks are performed on the flight line or at crash site.

Aerospace Ground Equipment (AGE) Repair Shop, Building 320.

This shop provides capability for pickup, repairs, modification, inspection and servicing of powerer AGE items and maintenance of all branch-assigned shop equipment.

Non-Power AGE Shop, Building 324.

This facility repairs, inspects and modifies all non-powered AGE trailers and munition trailers.

Corrosion Control, Building 355.

This shop inspects, paints and treats all assigned aircraft to prevent corrosion. This facility also supervises and controls the functions of the washrack. Also, this shop assists units in the treatment of corrosion as required.

Fuel System Repair, Building 328.

This shop cleans, inspects and repairs aircraft fuel cells and components as required.

Wheel and Tire Shop, Building 352.

This shop repairs, inspects and installs aircraft wheels and tires as required.

Armaments Systems, Building 505.

This facility repairs and cleans gun parts and components of the release systems of the A-10 aircraft.

Conventional Munitions Maintenance, Building 587.

This facility repairs, maintains and stores conventional weapons and transporters.

Missile Maintenance, Building 581.

This shop inspects, repairs and maintains missile guidance systems.

Munitions Equipment Maintenance, Building 580.

This facility maintains and repairs all munitions trailers.

Electric Shop, Building 352.

This facility tests, repairs and modifies aircraft electric powered generating systems.

Engine Shop, Building 324.

This shop is responsible for repairing, maintaining and cleaning all aircraft engines.

Non-Destructive Inspection (NDI) Shop, Building 352.

This shop is responsible for inspection of aircraft components for damaged or impaired service by use of optics, magnetic particles, penetrants, untrasonics and X-ray.

Pneudraulics Shop, Building 324.

This facility is responsible for maintenance on aircraft and equipment hydraulic and pneumatic systems. This shop provides testing of flexible hose assembly and testing of rigid tubing.

Precision Measurement Equipment Lab (PMEL), Building 519.

This shop performs maintenance and calibration on precision measuring equipment.

Electronic Countermeasures (ECM) Shop, Building 325.

This facility maintains electronic countermeasures equipment and components including assigned equipment for proper setting functions of the parts.

Vehicle Maintenance, Building 454.

This shop provides maintenance and painting of assigned vehicles.

Detachment 11 Rescue Shop, Building 359.

This shop repairs, inspects and maintains the rescue helicopters for Detachment 11.

FUELS MANAGEMENT

Jet Aircraft Fuel, JP-4, has been brought on base by three methods during the history of the base: rail tank car and/or truck tanker, and combination river barge to pipeline. Since 1964 the fuel has arrived via commercial pipeline opened by Myrtle Beach Pipeline Company, a subsidiary of Standard Southern Corporation, Houston, Texas. The fuel is brought up the Intracoastal Waterway on a barge operated by Hanover Towing Company. Upon arrival, the fuel is immediately pumped to a 1,050,000 gallon storage tank owned by the Myrtle Beach Pipeline Company. Fuel is then pumped as required by the Air Force from the Myrtle Beach Pipeline Company storage tank to one of two Air Force floating-cover storage tanks (1,050,000 and 420,000 gallons) located in the POL bulk fuel storage area. Prior to the pipeline operation, a rail spur entered the POL facilities and a system existed for unloading both rail cars and tank trucks. The system is no longer in operation, and the rail spur has been dismantled.

The responsibility for fuels under delivery to the Air Force is primarily under the control of the Myrtle Beach Pipeline Company. The pipeline from the barge offloading facility to the Myrtle Beach Pipeline Storage facility has cathodic protection. Meters also are installed at both ends of the line to determine leaks. During fuel transfers from the pipeline company to the Air Force, 30 minute sight readings on the storage tanks are exchanged. Should inconsistencies occur, the pumps would be immediately shut down and the discrepancy investigated. Tank gauging is recorded at both facilities prior to and after fuel movements.

The JP-4 bulk storage tanks at both the Myrtle Beach Pipeline Facility and the POL facility are surrounded by earthen dikes which contain the volume of the storage tank with one foot of freeboard. Rainwater drainage from the diked area of the Myrtle Beach Pipeline facility passes through a fuel/water separator prior to discharge to a storm drainage ditch. Rainwater drainage from the diked area of the Air Force bulk fuel storage facility also passes through a fuel/water separator with the water discharge going to a storm drainage ditch.

From the bulk storage area, JP-4 is pumped into tanker trucks to service aircraft on the flight line. An underground hydrant system was developed to dispense fuel on the flightline; however the system was never utilized.

Heating Fuels used on the base include No. 1 fuel oil, No. 2 fuel oil and No. 5 fuel oil. Fuel oil storage tanks are located adjacent to the individual building they are intended to serve. There are three No. 1 fuel oil storage tanks all above ground ranging in capacity from 100 to 500 gallons. There are 78 No. 2 fuel oil storage tanks ranging in capacity from 200 to 5,000 gallons. Twelve of the No. 2 fuel oil tanks are underground. These range in capacity from 250 to 3,000 gallons. Eight No. 5 fuel oil tanks are located on the base, ranging in capacity from 5,000 to 20,000 gallons. Five of the No. 5 fuel oil tanks are underground. These range in capacity from 10,000 to 20,000 gallons.

The underground fuel storage tanks are not routinely tested for leaks, creating a potential for small long term contamination problems occurring. Considering the density of No.5 fuel oil, it is unlikely that serious leaks would occur from these tanks. All of the fuel oil storage tanks are detailed in the Spill Prevention, Control and Countermeasure Plan. The individual heating oil tanks are serviced by an outside contractor on a "fill as required basis." The servicing contractor will inspect tanks routinely to assure that all tanks are filled to at least 30 percent of the tank capacity.

Automotive Gasoline (MOGAS) is brought to base by truck. Approximately 18,000 gallons (two vehicles) per month are utilized at the base. The mogas is delivered to the bulk storage area within the POL facility and stored in a 25,000 gallon underground tank. The tank is leak tested annually. There are 23 mogas storage tanks located in various areas around the base, 16 of these are underground. The two major distribution centers for mogas are the POL motor pool where three 5,000 gallon underground storage tanks are located and the BX service station where four 10,000 gallon underground storage tanks are located. The BX service station receives its fuel from an individual contractor and not the base bulk storage supply. Inventory controls are used to determine fuel losses from the major distribution centers.

Diesel Fuel is brought on base by truck. Approximately 5,000 gallons per month are utilized at the base. The diesel fuel is delivered to a 25,000 gallon underground tank located in the POL bulk fuel storage area. The tank is leak tested annually. The only distribution center for diesel fuel is the POL motor pool where a 5,000 gallon underground tank is located. The tank is monitored by inventory controls.

Aviation Gasoline (AVGAS) was bought on the base by truck or rail tanker and stored in a 21,000 gallon above-ground earthen diked tank located in the POL bulk storage area. Avgas is not used at the base any longer and the bulk storage tank was dismantled in the early 70's.

Other Petroleum Products used on the base include LP gas which is stored in 17 tanks ranging in capacity from 250 to 1,000 gallons. These tanks are located adjacent to the buildings which they serve. Only one of the storage tanks (250 gallons) is underground. This tank is located adjacent to building 326. One 500 gallon anti-freeze storage tank is located at the POL motor pool area.

APPENDIX G
DEFENSE ENVIRONMENTAL QUALITY PROGRAM
POLICY MEMORANDUM
DEQPPM NO. 80-5 AND NO. 80-8

Blue CY

OFFICE OF THE ASSISTANT SECRETARY OF DEFENSE

WASHINGTON, D.C. 20301

13 MAY 1980

MANPOWER,
SERVE AFFAIRS
NO LOGISTICS

Defense Environmental Quality Program Policy Memorandum
(DEQPPM No. 80-5)

MEMORANDUM FOR DEPUTY FOR ENVIRONMENT, SAFETY AND OCCUPATIONAL
HEALTH, OASA (ILSTH)
DEPUTY UNDER SECRETARY OF THE NAVY
DEPUTY FOR ENVIRONMENT AND SAFETY, SAF/MIQ
DIRECTOR, DEFENSE LOGISTICS AGENCY

SUBJECT: Department of Defense Hazardous Material Disposal Policy

PURPOSE: This is to provide Department of Defense (DoD) policy guidance on the disposal of hazardous materials. This memorandum supercedes DEQPPM 79-4, "Department of Defense Hazardous Material Disposal Policy," of December 17, 1979.

BACKGROUND: DoD possesses large quantities of hazardous materials, both new items and waste products, that must be disposed of in an environmentally acceptable manner. The Resource Conservation and Recovery Act of 1976 (RCRA) and the Toxic Substance Control Act of 1976 (TSCA) require that DoD update its disposal policy regarding hazardous materials.

In 1974, DoD designated the Defense Supply Agency, subsequently renamed the Defense Logistics Agency (DLA), to be responsible "... for the disposition of items identified as unsalable because the material has no sales value . . . (except) refuse and trash . . . (and) items . . . restricted by law or military regulation." Some of the materials reassigned to DLA were hazardous, but the overall hazardous material disposal responsibility was not specifically addressed in the 1974 policy.

In December of 1979, the Deputy Assistant Secretary of Defense, Energy, Environment and Safety (DASD-EES), in coordination with the Deputy Assistant Secretary of Defense, Supply, Maintenance, and Transportation (DASD-SM&T), issued Defense Environmental Quality Program Policy Memorandum 79-4 (DEQPPM 79-4) which provided urgently needed guidance on hazardous material disposal. After the policy was issued, representatives of the military departments, DLA, and OASD(MRA&L) agreed to refine further DoD policy. This DEQPPM 80-5 includes the refinements which those representatives recommended. For purposes of this memorandum, the term DoD components refers to the military departments and all defense agencies except disposal operating entities of DLA. Other terms used in this policy are defined in Tab A.

POLICY: DoD policy is to dispose of hazardous materials in an environmentally acceptable manner.

- DLA is designated the responsible agency within DoD for worldwide disposal of all hazardous materials, except for those categories of materials specifically designated for DoD component disposal (Tab B). Specific DLA responsibilities for disposal of assigned hazardous materials are in Tab C.

- DoD components shall dispose of those categories of hazardous materials listed in Tab B. In addition, the DoD component shall support DLA disposal actions as specified in Tab D.

- The DASD(EES), in coordination with DASD(SM&T) and other OSD offices as necessary, shall formulate, implement, and monitor policy for disposal of hazardous material and shall decide any unresolved issues which may develop, including the reassignment of responsibility for disposal of specific categories of hazardous material when circumstances warrant.

- No other changes are made to the respective disposal mission responsibilities of the DoD components or DLA.

IMPLEMENTATION: This memorandum is effective immediately and should be implemented as rapidly as possible.

- DLA shall make optimum use of existing disposal capabilities and resources.

- DLA shall program for the additional resources required to discharge its responsibilities under this memorandum.

- DLA is directed to organize immediately and chair an inter-service task group to plan actions and milestones for the full implementation of this policy and submit their report to DASD(EES) within 120 days from the date of this memorandum.

- The task group will develop and promulgate a hazardous materials data call to identify current and projected hazardous materials disposal workload, as well as the actions and methodology employed to dispose of those materials. The task group should also identify, in as much detail as possible, the technical support and assistance which can be provided DLA in its efforts to insure expeditious disposal of hazardous materials in an environmentally safe manner. The task group will identify those additional resource requirements which, if made available to DLA, can be effectively applied to expedite hazardous materials disposal during FY 80 and FY 81.

SIGNED

Paul H. Riley
Deputy Assistant Secretary of Defense
(Supply, Maintenance and Transportation)

SIGNED

George Marienthal
Deputy Assistant Secretary
of Defense
(Energy, Environment and Safety)

Enclosures:

- Tab A - Definitions
- Tab B - Materials Assigned to DoD Components
for Disposal
- Tab C - Responsibilities of DLA for Disposal
of Assigned Hazardous Materials
- Tab D - Responsibilities of the DoD Components
in Support of the DLA Disposal of Hazardous
Materials.

MR/Reading/EES

P. Haviland/ds/57820/6May80

DEFINITIONS

Material is hazardous when, because of its quantity, concentration, or physical, chemical, or infectious characteristics, it may: (a) cause, or significantly contribute to, an increase in mortality or an increase in serious, irreversible, or incapacitating reversible illness; or (b) pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported, disposed of, or otherwise managed.

For the purposes of this memorandum, hazardous materials do not include those radioactive materials that the Nuclear Regulatory Commission controls. Licensees shall be responsible for the disposal of those materials per 10 CFR 20.

Hazardous material may be defined as personal property consisting of items, scrap, and waste:

Items - All unused, used, or contaminated property or combinations of property, (unused, used, mixed or contaminated) which can be identified by a national stock number, manufacturer's part number, military specification number, or locally purchased property with a locally applied stock number. Also, that property which by military regulation requires application of a local stock number prior to disposal.

Scrap - Used or unused property which has no value except for basic material content.

Waste - Used or unused property, residues, by-products, sludges, and other materials, which have no known utility and must, therefore, be discarded.

Conforming storage is a facility or location which conforms to regulations of the Environmental Protection Agency and other regulatory authorities governing the storage of hazardous materials.

The generating activity is an organization or element authorized to turn-in property to the Defense Property Disposal Service.

Materials Assigned to DoD
Components for Disposal

DoD components shall be responsible for disposal of the following categories of hazardous materials which have not been assigned to DLA:

1. Toxicological, biological, radiological, and lethal chemical warfare materials which, by U.S. law, must be destroyed. Disposal of the by-products of such material is the responsibility of the DoD component with assistance from DLA.
2. Material which cannot be disposed of in its present form due to military regulations, e.g., consecrated religious items and cryptographic equipment.
3. Municipal type garbage, trash, and refuse resulting from residential, institutional, commercial, agricultural, and community activities, which the facility engineer or public works office routinely collect.
4. Contractor generated materials which are the contractor's responsibility for disposal under the terms of the contract.
5. Sludges resulting from municipal type wastewater treatment facilities.
6. Sludges and residues generated as a result of industrial plant processes or operations.
7. Refuse and other discarded materials which result from mining, dredging, construction, and demolition operations.
8. Unique wastes and residues of a non-recurring nature which research and development experimental programs generate.

Responsibilities of the DoD Components
in Support of the DLA Disposal of
Hazardous Materials

1. Where feasible, minimize quantities of hazardous waste through resource recovery, recycling, source separation, and acquisition policies.
2. Provide available technical and analytical assistance, including R&D support, to DLA to accomplish disposal, if requested.
3. Provide all available information to DLA, as required, to complete environmental documentation, e.g., environmental impact statement associated with disposal.
4. Properly identify, package, label, and certify conformance with established criteria prior to transfer of accountability to DLA. Subsequent repackaging or handling is the responsibility of DLA.
5. DoD components will retain custody of hazardous materials within the following guidelines:
 - If DLA does not possess conforming storage at the DFDO, and the generating activity has conforming storage in support of mission requirements, the generating activity will retain physical custody, and DLA will accept accountability.
 - In those instances where neither DLA nor the generating activity possesses conforming storage, the activity with the "most nearly" conforming storage will accept/retain custody.
 - If DLA and the component involved cannot agree on the best procedure for storage and handling pending final disposal, the issue will be referred at once to OASD(MRA&L) for resolution.
 - When a DoD component retains custody of a hazardous material, this hazardous material shall be kept on the accountable records of DLA.
6. When requested, the DoD components will assist DLA by providing information and comments on federal, state, regional, and local regulations being developed to control hazardous material disposal, e.g., ability of particular installations to comply and impact on DoD. The DoD components will alert DLA to any local situation which could impact on hazardous materials disposal.
7. DoD components shall program to carry out their responsibilities through normal budgeting channels.

Responsibilities of DLA
for Disposal of
Assigned
Hazardous Materials

Specific DLA responsibilities in this area shall include, but not necessarily be limited to, the following:

1. Accomplish documentation for DLA disposal actions as required under laws and regulations.

2. Initiate contracts or agreements for disposal.

3. Accept accountability for all hazardous materials except those categories specifically excluded in Tab B, which have been properly identified, packaged, labeled, and certified in conformance with established criteria.

4. Accept custody of hazardous materials within the following guidelines:

- If DLA possesses conforming storage at the defense property disposal offices (DPDO), DLA will accept physical custody at the time it accepts accountability.

- If DLA does not possess conforming storage at the DPDO, and the generating activity has conforming storage in support of mission requirements, the generating activity will retain physical custody, and DLA will accept accountability.

- In ^{these} ~~this~~ instances where neither DLA nor the generating activity possess conforming storage, the activity with the "most nearly" conforming storage will accept or retain physical custody and DLA will accept accountability.

- DLA will be responsible for the long term programming of military construction funding for conforming storage in support of its disposal mission.

- If DLA and the component involved cannot mutually agree on the best procedure for storage and handling pending final disposal, the issue shall be referred at once to OASD(MRA&L) for resolution.

5. Provide any required repackaging or handling of hazardous materials subsequent to acceptance of accountability from the generating activity.

6. Establish an inventory control system for the types, quantities, and locations of available hazardous materials for which DLA is responsible in the event that some other activity might be able to use a particular material as a resource.

7. Provide feedback to the military departments and defense agencies on the costs associated with disposal in order that this information might serve as an economic incentive to minimize waste generation.

8. Contract for disposal technology not available in-house or from the DoD components.

9. Minimize environmental risks and costs associated with extended care, handling, and storage of hazardous materials by accomplishing disposal within a significantly compressed disposal cycle. Initiate actions and projects within DoD and in conjunction with federal civil agencies and industry to realize this objective and expedite final disposal.

10. Devise a system by which the time of turn-in will be highly visible on hazardous materials to insure proper application of resources to dispose of these materials. DLA should insure that sufficient disposal capability is programmed to preclude extended delays in the hazardous materials disposal process.

11. Establish and maintain an analysis and information distribution capability to:

- Evaluate the impact and applicability of current technological advances on DoD hazardous material disposal procedures and inform the DoD components of these developments on a continuing basis.

- Assure that the DoD components are apprised, on a continuing basis, of any federal, state, regional, and local regulations being developed to control hazardous material disposal.

12. Become the DoD focal point to recommend to DASD(EES) matters of policy and guidance for hazardous material disposal.

13. Establish procedures relative to assigned responsibility for hazardous material disposal. Unresolved issues will be forwarded to OASD(MRA&L) with appropriate comments.

14. DLA shall program to carry out their responsibilities through normal budgeting channels.



WASHINGTON, D.C. 20301

MANPOWER.
RESERVE AFFAIRS
NO LOGISTICS

21 October 1980

DEFENSE ENVIRONMENTAL QUALITY PROGRAM POLICY MEMORANDUM (DEQPPM) 80-8

MEMORANDUM FOR ASSISTANT SECRETARY OF THE ARMY (IL&FM)
ASSISTANT SECRETARY OF THE NAVY (MRA&L)
DEPUTY UNDER SECRETARY OF THE NAVY
ASSISTANT SECRETARY OF THE AIR FORCE (MPA&I)
ASSISTANT SECRETARY OF THE AIR FORCE (RD&L)
DIRECTORS OF DEFENSE AGENCIES

SUBJECT: RCRA Hazardous Waste Management Regulations

PURPOSE: This is to provide additional policy guidance to implement within the Department of Defense the hazardous waste management regulations of the Resource Conservation and Recovery Act (RCRA) of 1976.

BACKGROUND: On May 19, 1980, the Environmental Protection Agency (EPA) published implementing instructions to Subtitle C of RCRA which established a federal program to provide comprehensive regulation of hazardous waste. When fully implemented, this program will provide "cradle-to-grave" regulation of hazardous waste.

The Department of Defense is an entity responsible for determining when a material becomes a waste subject to RCRA Regulations. Applying the criteria set forth in Subparts C and D of 40 CFR Part 261 further qualifies the waste as hazardous at which point the RCRA Regulations become effective. Also, RCRA establishes standards for generators and transporters of hazardous waste that will ensure proper record-keeping and reporting, the use of a manifest system to track shipments of hazardous waste, the use of proper labels and containers, and the delivery of the waste to properly permitted treatment, storage, and disposal facilities. To ensure that these facilities are designed, constructed, and operated in a manner which protects human health and the environment, the regulations promulgate technical, administrative, monitoring, and financial standards for them. EPA will use these independently enforceable standards to issue permits to owners and operators of facilities.

Also in May, 1980, Defense Environmental Quality Program Policy Memorandum 80-5 was published to provide DoD policy on the disposal of hazardous materials. That policy designates the Defense Logistics Agency as responsible for the disposal of all hazardous materials except those that specifically remain the other DoD components' responsibilities.

POLICY: The DoD policy is:

- To limit the generation of hazardous waste through alternative procurement practices and operational procedures that are attractive environmentally yet are fiscally competitive,
- To reutilize, reclaim, or recycle resources where practical and thus conserve on total raw material usage,
- To exhaust all other actions mandated by Federal statutes or regulations prior to identifying the material as discardable,
- To dispose of hazardous waste in an environmentally acceptable manner according to the disposal policy established in DEQPPM 80-5,
- To implement within DoD the hazardous waste management regulations that EPA published under Subtitle C of RCRA or that states enact under EPA authorization,
- To consider all unused hazardous materials as not regulated under RCRA until a decision is made to discard them, and
- To insure that all used hazardous materials are safely handled, accounted for, and controlled by internal DoD documentation. The internal controlling documentation will be applied to all movement among DoD activities and will reflect all data elements prescribed for auditing purposes and for shipping manifests as required by EPA or the states. The DoD component/entity assigned disposal responsibility by DEQPPM 80-5 will advise the using activities as to which "used" hazardous material must be controlled as a hazardous waste.

ACTION REQUIRED: DoD components will:

- Reduce hazardous waste generation to the maximum extent practical,
- Reutilize, reclaim, or recycle resources where practical, and
- Implement EPA hazardous waste management regulations.

As part of that implementation, any DoD installation that generates or transports hazardous waste or owns or operates a facility that treats, stores, or disposes of hazardous waste will notify EPA regional administrators as required. Each installation will obtain one EPA identification number. That identification number will be used for all subsequent reports and permit applications required for the installation.

Also, any installation which owns, operates, or proposes to own or operate a facility that treats, stores, or disposes of hazardous waste will apply for a permit from EPA or the state. That application is in two parts:

- Part A, which defines the process to be used, the design capability, and the hazardous waste to be handled, must be submitted by November 19, 1980.
- Part B, which contains more detailed information intended to establish that the facility can meet the technical standards that RCRA promulgated, must be submitted at a date that the regional administrator sets.

The installation commander will sign the permit application as the facility owner, and the operational manager of the permitted facility will sign the permit application as the operator. DLA or other tenants will sign as operation manager for all functions for which they have been assigned responsibility under DEQPPM 80-5. Each installation that requires a permit will submit one EPA Form 3510-1 for the installation (Form 1 - General Information) and an EPA Form 3510-3 for each permitted facility (Form 3 - Hazardous Waste Permit Application).

Implementation of the comprehensive hazardous waste management program mandated by RCRA requires maximum cooperation of all activities on an installation. The installation commander is responsible to ensure compliance with all RCRA requirements for the installation. The installation commander is responsible to notify, to apply for permits, and to report to EPA or the state, as required, for all installation activities, including tenants. The individual facility operational managers are accountable for conducting their activities in accordance with RCRA. Those facility managers, including supporting property disposal activities and tenant activities, will provide necessary documentation to the installation commander for permit application, will provide to the installation commander reports required by EPA or the state, and will ensure compliance with RCRA regulations and permit requirements at that facility. All reports to EPA or the state will be co-signed by the installation and facility operator or their designated officials.

For facilities that DoD owns but does not operate, the DoD component that owns the facility is responsible as the owner for purposes of the permit. For example, on an Army government-owned, contractor-operated plant, the contractor may be the applicant for the permit, but the local Army commanding officer is still responsible to ensure compliance.

DoD components will use the Disposal Turn In Document (DTID) or a bill of lading, as appropriate, modified to meet the EPA requirements, for the shipping manifest. The shipping activity, either servicing property disposal activity or facility operator, will manifest any shipment of hazardous waste off the installations in accordance with RCRA. The responsibility for tracking the manifest terminates at the permitted facility destination for that shipment; however, the shipper must obtain a copy of the completed manifest to show arrival at that destination. For shipments among DoD components, whether on the same installation or between installations, the turn-in activity's responsibility terminates upon receipt of a signed copy of the Disposal Turn In Document (DTID) or the govern-

ment bill of lading which serves as the internal manifest between the generator, the servicing DPDO, or other permitted receiver.

Each DoD component will take immediate action to identify all resources required to achieve full compliance with EPA and state regulations. Those resources will then be addressed, within program decision memorandum approved overall component resource levels, in future budget submissions.

An installation that requires permits for more than one program (RCRA, Safe Drinking Water Act, Clean Water Act, and Clean Air Act programs) is encouraged to consolidate its application, if possible, under EPA's consolidated permit program.

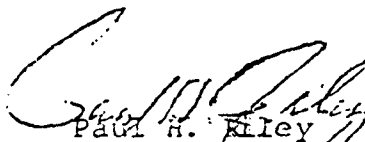
In special circumstances, and where it is mutually agreed among the installation, tenant, and EPA/State, exceptions to the above policies will be documented by the DoD component concerned and forwarded to DASD(EES) for approval.

The DASD(EES), in coordination with DASD(SM&T) and other OSD offices as necessary, shall monitor policy implementation for RCRA hazardous waste management, and shall decide any unresolved issues which may develop.

This memorandum is effective this date. Progress toward implementation of this memorandum and the RCRA hazardous waste regulations will be included in the environmental management-by-objective (EMBO) semi-annual reports.



George Marienthal
Deputy Assistant Secretary of Defense
(Energy, Environment and Safety)



Paul H. Riley
Deputy Assistant Secretary of Defense
(Supply, Maintenance and Transportation)

APPENDIX H
HAZARD EVALUATION METHODOLOGY

APPENDIX H

HAZARD EVALUATION METHODOLOGY

PRELIMINARY POTENTIAL CONTAMINATION ASSESSMENT

Various numerical methods for preliminary assessment of sites to determine the need of follow-up action have been developed. Under the auspices of EPA's Office of Enforcement, JRB Associates have devised a methodology for selecting sites for further investigation based on their potential for adverse environmental impact. A modified JRB technique has been developed by Engineering-Science and CH₂M Hill for analysis of the Phase I IRP studies (see memorandum dated July 8, 1981 at end of this Appendix). The methodology relies primarily on available information, but does provide some mechanisms for handling missing data so that sites can be preliminarily rated in most cases. A brief discussion of the rating factor system of analysis follows.

Site rating Factor System

The following four basic assessment criteria categories are used in the evaluation:

- Receptors
- Pathways
- Waste Characteristics, and
- Waste Management Practices

These categories have been further broken down into 31 generally applicable rating factors as presented in Table H-1. For each of the factors, a four-level rating scale has been developed ranging from "0" (indicating no potential hazard) to "3" (indicating a high potential hazard). These rating scales are also presented in Table H-1. It should be pointed out that these scales have been devised so that rating factors can typically be evaluated on the basis of readily available information from published materials, public and private records, interviews with knowledgeable parties and site visits.

TABLE H.1

RATING FACTOR SYSTEM

RATING FACTORS	RATING SCALE LEVELS			
	0	1	2	3
RECEPTORS				
Population Within 1,000 Feet	0	1 to 25	26 to 100	Greater than 100
Distance to Nearest Drinking Water Well	Greater than 3 miles	1 to 3 miles	3,001 feet to 1 mile	0 to 3,000 feet
Distance to Reservation Boundary	Greater than 2 miles	1 to 2 miles	1,001 feet to 1 mile	0 to 1,000 feet
Land Use/Zoning	Completely remote (zoning not applicable)	Agricultural	Commercial or industrial	Residential
Critical Environments	Not a critical environment	Pristine natural areas	Wetlands, floodplains, and preserved areas; presence of economically important natural resources	Major habitat of an endangered or threatened species; presence of recharge area
Water Quality Designation of Nearest Surface Water Body	Agricultural or industrial use	Recreation, pagination and management of fish & wildlife	Shellfish pagination and harvesting	Potable water supplies

RATING FACTOR SYSTEM (cont'd)

H-3

TABLE H.1

RATING FACTOR SYSTEM (cont'd)

WASTE CHARACTERISTICS

Judgemental hazardous rating from 30 to 100 points based on the following guidelines:

Points	Condition
30	Closed domestic-type landfill, old site, no known hazardous wastes
40	Closed domestic-type landfill, recent site, no known hazardous wastes
50	Suspected small quantities of hazardous wastes
60	Known small quantities of hazardous wastes
70	Suspected moderate quantities of hazardous wastes
80	Known moderate quantities of hazardous wastes
90	Suspected large quantities of hazardous wastes
100	Known large quantities of hazardous wastes

Hazardous waste rating shall consider such characteristics as toxicity, radioactivity, persistence, ignitability, reactivity, corrosivity, solubility, volatility, and physical state.

TABLE H.1

RATING FACTOR SYSTEM (con'd)

RATING FACTORS	RATING SCALE LEVELS		
	0	1	2
			3
	WASTE MANAGEMENT PRACTICES		
Record Accuracy and Ease of Access to Site	Accurate records, no unauthorized dumping	Accurate records, no barriers	Incomplete records, no barriers
Hazardous Waste Quantity	<1 ton	1 to 5 tons	5 to 20 tons
Total Waste Quantity	0 to 10 acre ft.	11 to 100 acre ft.	101 to 250 acre ft.
Waste Incompatibility	No incompatible wastes are present	Present, but does not pose a hazard	Present and may pose a future hazard
Absence of Liners or Confining Strata	Liner and confining strata	Liner or confining strata	Low quality liner or low permeability strata
Use of Leachate Collection Systems	Adequate collection and treatment	Inadequate collection or treatment	Inadequate collection and treatment
Use of Gas Collection Systems	Adequate collection and treatment	Collection and controlled flaring	Venting or inadequate treatment
Site Closure	Impermeable cover	Low permeability cover	Permeable cover
Subsurface Flows	Bottom of landfill greater than 5 ft. above high groundwater level	Bottom of landfill occasionally submerged	Bottom of fill frequently submerged
			mean groundwater level

Since the rating factors do not all assess the same magnitude of potential environmental impact, a numerical multiplier has been assigned to each factor. These multipliers were developed to indicate the relative magnitude of impact of that factor. In addition, weighting factors have been assigned to the Factor Subscores to arrive at a properly balanced Overall Score.

The following five hazard potential scores are the result of a site rating:

- Overall Score
- Receptors Subscore
- Pathways Subscore
- Waste Characteristics Subscore, and
- Waste Management Subscore

MEMORANDUM

TO: Mr. Bernard Lindenberg, AFESC, Tyndall AFB, FL
Major Gary Fishburn, USAF OEHL, Brooks AFB, TX

FROM: Norman N. Hatch, Jr., CH₂M HILL, Gainesville, FL, MNH by E/S
Ernest J. Schroeder, Engineering-Science, Atlanta, GA, E/S

DATE: July 8, 1981

SUBJECT: Joint Meeting between CH₂M HILL and Engineering-Science to
develop a uniform site rating system for use in all Air Force
Installation Restoration Program Records Search Projects.

MEETING

LOCATION: CH₂M HILL, Gainesville, Florida office

MEETING

DATE: Monday, June 29, 1981

A. Introduction and Purpose

A joint meeting was held at the CH₂M HILL Gainesville, Florida office on Monday, June 29, 1981. The purpose of the meeting was to develop a uniform site rating system for use in all upcoming Air Force Installation Restoration Program Records Search projects. Attendees at the meeting included:

- o Norman N. Hatch, Jr., CH₂M HILL Representative
- o Ernest J. Schroeder, Engineering-Science Representative
- o Major Gary Fishburn, Air Force Observer

The basis for the rating system is the document developed by JRB Associates, Inc., Mclean, Virginia, for the EPA Hazardous Waste Enforcement Office, Washington, D.C. The above document presents a methodology for selecting sites for investigation based on their potential for adverse environmental impact. Careful scrutiny of this document by CH₂M HILL and Engineering-Science indicated that the rating system could readily be used, with some modifications, for evaluating Air Force Installation sites.

Memorandum
July 8, 1981
Page Two

These modifications would be necessary for the following reasons:

1. The methodology presented in the JRB document was developed primarily for large landfill operations throughout the nation. Modifications are necessary to accurately address specific Air Force installation conditions.
2. The rating system must include an equivalent comparison of landfill sites and suspected contaminated sites other than landfills, e.g., PCB spills.

B. Modifications to the JRB Rating System

The specific modifications jointly developed by CH₂M HILL and Engineering-Science, based on experience in performing Record Searches at several Air Force installations, are presented in the revised JRB rating form and rating factor system (attached). The modifications, in general, are summarized below:

1. Changes in multipliers for several of the rating factors in the receptors, pathways, and waste management practices categories.
2. Deletion of several existing rating factors and addition of new rating factors in the receptors, pathways, and waste management practices categories.
3. Revision of the waste characteristics category.
4. Special considerations in the use of the waste management practices category to provide meaningful comparison of landfills and contaminated areas other than landfills. These special considerations include:
 - a. Use of all nine rating factors for the evaluation of landfills.
 - b. Deletion of non-applicable rating factors when evaluating other contaminated areas. the category score is then normalized to provide an equivalent comparison with landfills.

CONCLUSION

All parties present at the meeting agreed that the above modifications would provide a meaningful rating system for Air Force installation sites. The system will be used in the next several Record Searches and then re-evaluated to determine if further modifications are necessary.

NNH/EJS/lmr

APPENDIX I
INDIVIDUAL WASTE RATING FORMS

SITE RATING FORMS
TABLE OF CONTENTS

<u>SITE</u>	<u>PAGE</u>
Landfill Number 1	I-1
Landfill Number 2	I-3
Landfill Number 3	I-5
Landfill Number 4	I-7
Landfill Number 5	I-9
Burn Pit Number 1	I-11
Burn Pit Number 2	I-11
Burn Pit Number 3	I-13
Burn Pit Number 4	I-15
Weathering Pit Number 1	I-17
Weathering Pit Number 2	I-19
Myrtle Beach Pipeling Corp. Tank	I-21
Flightline Contaminated Area	I-23
POL Bulk Fuel Storage Area	I-25
Underground Waste Chemical Storage	I-27
Radioactive Vault	I-29

WASTE DISPOSAL SITE AND STILL AREA
ASSESSMENT AND RATING FORM

Name of Site Landfill Number 1
Location Western side of Aerovox Road - under the golf course
Owner/Operator _____
Comments _____

RATING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
RECEPTORS				
Population Within 1,000 Feet	2	4	8	12
Distance to Nearest Drinking Water Well	3	15	45	45
Distance to Reservation Boundary	3	6	18	18
Land Use, Zoning	2	3	6	9
Critical Environments	3	12	36	36
Water Quality of Nearby Surface Water Body	1	6	6	18
Number of Assumed Values = <u>0</u> Out of 6			SUBTOTALS	<u>119</u> <u>138</u>
Percentage of Assumed Values = <u>0</u> %			SUBSCORE	<u>86</u>
Number of Missing Values = <u>0</u> Out of 6			(Factor Score Divided by Maximum Score and Multiplied by 100)	
Percentage of Missing Values = <u>0</u> %				

PATHWAYS				
Evidence of Water Contamination	0	10	0	30
Level of Water Contamination	0	15	0	45
Type of Contamination, Soil, Biota	0	5	0	15
Distance to Nearest Surface Water	3	4	12	12
Depth to Groundwater	3	7	21	21
Net Precipitation	2	6	12	18
Soil Permeability	3	6	18	18
Bedrock Permeability	3	4	12	12
Depth to Bedrock	0	4	0	12
Surface Erosion	1	4	4	12
Number of Assumed Values = <u>0</u> Out of 10			SUBTOTALS	<u>79</u> <u>195</u>
Percentage of Assumed Values = <u>0</u> %			SUBSCORE	<u>41</u>
Number of Missing Values = <u>0</u> Out of 10			(Factor Score Divided by Maximum Score and Multiplied by 100)	
Percentage of Missing Values = <u>0</u> %				

WASTE CHARACTERISTICS

Hazardous Rating: Judgemental rating from 30 to 100 points based on the following guidelines:

Points

30	Closed domestic-type landfill, old site, no known hazardous wastes
40	Closed domestic-type landfill, recent site, no known hazardous wastes
50	Suspected small quantities of hazardous wastes
60	Known small quantities of hazardous wastes
70	Suspected moderate quantities of hazardous wastes
80	Known moderate quantities of hazardous wastes
90	Suspected large quantities of hazardous wastes
100	Known large quantities of hazardous wastes

SUBSCORE

30

Reason for Assigned Hazardous Rating:

Oldest landfill; used between 1955 and 1960 for general base refuse. Site is re-vegetated - operated as burn and cover operation - received small quantities of hazardous waste.

SCORING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
WASTE MANAGEMENT PRACTICES				
Record Accuracy and Access to Site *	3	7	21	21
Hazardous Waste Quantity	0	7	0	21
Total Waste Quantity	1	4	4	12
Waste Incompatibility *	1	3	3	9
Absence of Liners or Confining Beds	3	6	18	18
Use of Leachate Collection System	3	6	18	18
Use of Gas Collection Systems	3	2	6	6
Site Closure	2	8	16	24
Subsurface Flows	1	7	7	21
Number of Assumed Values = 2 Out of 9	SUBTOTALS		93	150
Percentage of Assumed Values = 22 %	SUBSCORE			62
Number of Missing and Non-Applicable Values = 0 Out of 9	(Factor Score Divided by Maximum Score and Multiplied by 100)			
Percentage of Missing and Non-Applicable Values = 0 %				

Overall Number of Assumed Values = 2 Out of 25

Overall Percentage of Assumed Values = 8 %

OVERALL SCORE

53

*Assumed
**Missing

(Receptors Subscore X 0.22 plus
Pathways Subscore X 0.30 plus
Waste Characteristics Subscore X 0.24 plus
Waste Management Subscore X 0.24)

WASTE DISPOSAL SITE AND SPILL AREA
ASSESSMENT AND RATING FORM

Name of Site Landfill Number 2
Location South of Ordnance Road and North of POL bulk storage facility
Owner/Operator _____
Comments _____

RATING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
RECEPTORS				
Population Within 1,000 Feet	1	4	4	12
Distance to Nearest Drinking Water Well	3	15	45	45
Distance to Reservation Boundary	2	6	12	18
Land Use/Zoning	2	3	6	9
Critical Environments	3	12	36	36
Water Quality of Nearby Surface Water Body	2	6	12	18
Number of Assumed Values = <u>0</u> Out of 6			SUBTOTALS	115
Percentage of Assumed Values = <u>0</u> %			SUBSCORE	81
Number of Missing Values = <u>0</u> Out of 6			(Factor Score Divided by Maximum Score and Multiplied by 100)	
Percentage of Missing Values = <u>0</u> %				

PATHWAYS				
Evidence of Water Contamination *	0	10	0	30
Level of Water Contamination	0	15	0	45
Type of Contamination, Soil/Biota	0	5	0	15
Distance to Nearest Surface Water	3	4	12	12
Distance to Groundwater	3	7	21	21
Net Precipitation	2	6	12	18
Soil Permeability	3	6	18	18
Bedrock Permeability	3	4	12	12
Depth to Bedrock	0	4	0	12
Surface Erosion	3	4	12	12
Number of Assumed Values = <u>1</u> Out of 10			SUBTOTALS	87
Percentage of Assumed Values = <u>10</u> %			SUBSCORE	45
Number of Missing Values = <u>0</u> Out of 10			(Factor Score Divided by Maximum Score and Multiplied by 100)	
Percentage of Missing Values = <u>0</u> %				

*Assumed

WASTE CHARACTERISTICS

Hazardous Rating: Judgemental rating from 30 to 100 points based on the following guidelines:

Points

30	Closed domestic-type landfill, old site, no known hazardous wastes
40	Closed domestic-type landfill, recent site, no known hazardous wastes
50	Suspected small quantities of hazardous wastes
60	Known small quantities of hazardous wastes
70	Suspected moderate quantities of hazardous wastes
80	Known moderate quantities of hazardous wastes
90	Suspected large quantities of hazardous wastes
100	Known large quantities of hazardous wastes

SUBSCORE 30

Reason for Assigned Hazardous Rating:

Landfill used between 1960 and 1964 for general base refuse. Only partially re-vegetated -
operated as burn and cover operation - received small quantities of hazardous waste.

RATING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
WASTE MANAGEMENT PRACTICES				
Record Accuracy and Ease of Access to Site	3	7	21	21
Hazardous Waste Quantity	1	7	7	21
Total Waste Quantity	1	4	4	12
Waste Incompatibility	1	3	3	9
Presence of Liners or Confining Beds	3	6	18	18
Use of Leachate Collection System	3	6	18	18
Use of Gas Collection Systems	3	2	6	6
Site Closure	2	8	16	24
Subsurface Flows	1	7	7	21
Number of Assumed Values = <u>2</u> Out of 9	SUBTOTALS		<u>100</u>	<u>150</u>
Percentage of Assumed Values = <u>22</u> %	SUBSCORE			<u>67</u>
Number of Missing and Non-Applicable Values = <u>0</u> Out of 9	(Factor Score Divided by Maximum Score and Multiplied by 100)			
Percentage of Missing and Non-Applicable Values = <u>0</u> %				
Overall Number of Assumed Values = <u> </u> Out of 25	OVERALL SCORE			
Overall Percentage of Assumed Values = <u> </u> %	<u>51</u>			

(Receptors Subscore X 0.22 plus
 Pathways Subscore X 0.30 plus
 Waste Characteristics Subscore X 0.24 plus
 Waste Management Subscore X 0.24)

WASTE DISPOSAL SITE AND SPILL AREA
ASSESSMENT AND RATING FORM

Name of Site Landfill Number 3
 Location Located adjacent to old State Route 707
 Owner/Operator _____
 Comments _____

RATING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
RECEPTORS				
Population Within 1,000 Feet	1	4	4	12
Distance to Nearest Surface Water Well	3	15	45	45
Distance to Reservation Boundary	3	6	18	18
Land Use/Zoning	2	3	6	9
Critical Environments	3	12	36	36
Water Quality of Nearby Surface Water Body	2	6	12	18
Number of Assumed Values = <u>0</u> Out of 6		SUBTOTALS		<u>121</u> <u>138</u>
Percentage of Assumed Values = <u>0</u> %		SUBSCORE		<u>88</u>
Number of Missing Values = <u>0</u> Out of 6		(Factor Score Divided by Maximum Score and Multiplied by 100)		
Percentage of Missing Values = <u>0</u> %				

PATHWAYS				
Evidence of Water Contamination	2	10	20	30
Level of Water Contamination	1	15	15	45
Type of Contamination, Soil/Biota	1	5	5	15
Distance to Nearest Surface Water	3	4	12	12
Depth to Groundwater	3	7	21	21
Net Precipitation	2	6	12	18
Soil Permeability **	3	6	18	18
Bedrock Permeability	3	4	12	12
Depth to Bedrock	0	4	0	12
Surface Erosion	2	4	8	12
Number of Assumed Values = <u>0</u> Out of 10		SUBTOTALS		<u>123</u> <u>195</u>
Percentage of Assumed Values = <u>0</u> %		SUBSCORE		<u>63</u>
Number of Missing Values = <u>1</u> Out of 10		(Factor Score Divided by Maximum Score and Multiplied by 100)		
Percentage of Missing Values = <u>10</u> %				

WASTE CHARACTERISTICS

Hazardous Rating: Judgemental rating from 30 to 100 points based on the following guidelines:

Points

30	Closed domestic-type landfill, old site, no known hazardous wastes
40	Closed domestic-type landfill, recent site, no known hazardous wastes
50	Suspected small quantities of hazardous wastes
60	Known small quantities of hazardous wastes
70	Suspected moderate quantities of hazardous wastes
80	Known moderate quantities of hazardous wastes
90	Suspected large quantities of hazardous wastes
100	Known large quantities of hazardous wastes

SUBSCORE 60

Reason for Assigned Hazardous Rating:

Landfill in operation between 1964 through 1968 for general base refuse - no burning allowed -
known small quantities of hazardous waste - leachate observed in past

RATING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
WASTE MANAGEMENT PRACTICES				
Record Accuracy and Ease of Access to Site	3	7	21	21
Hazardous Waste Quantity	1	7	7	21
Total Waste Quantity	1	4	4	12
Waste Incompatibility	1	3	3	9
Absence of Liners or Confining Beds	3	6	18	18
Use of Leachate Collection System	3	6	18	18
Use of Gas Collection Systems	3	2	6	6
Site Closure	2	8	16	24
Subsurface Flows	1	7	7	21
Number of Assumed Values = <u>2</u> Out of 9	SUBTOTALS		<u>100</u>	<u>150</u>
Percentage of Assumed Values = <u>22 %</u>	SUBSCORE			<u>67</u>
Number of Missing and Non-Applicable Values = <u>0</u> Out of 9	(Factor Score Divided by Maximum Score and Multiplied by 100)			
Percentage of Missing and Non-Applicable Values = <u>0 %</u>				
Overall Number of Assumed Values = <u>2</u> Out of 25	OVERALL SCORE			<u>68</u>
Overall Percentage of Assumed Values = <u>8 %</u>	(Receptors Subscore X 0.22 plus Pathways Subscore X 0.30 plus Waste Characteristics Subscore X 0.24 plus Waste Management Subscore X 0.24)			

WASTE DISPOSAL SITE AND SPILL AREA
ASSESSMENT AND RATING FORM

Name of Site Landfill Number 4
Location North of Golf Course and Northeast of Jetport
Owner/Operator _____
Comments _____

RATING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
RECEPTORS				
Population Within 1,000 Feet	2	4	8	12
Distance to Nearest Drinking Water Well	3	15	45	45
Distance to Reservation Boundary	3	6	18	18
Land Use/Zoning	2	3	6	9
Critical Environments	3	12	36	36
Water Quality of Nearby Surface Water Body	1	6	6	18
Number of Assumed Values = <u>0</u> Out of 6			SUBTOTALS	<u>119</u> <u>138</u>
Percentage of Assumed Values = <u>0</u> %			SUBSCORE	<u>86</u>
Number of Missing Values = <u>0</u> Out of 6			(Factor Score Divided by Maximum Score and Multiplied by 100)	
Percentage of Missing Values = <u>0</u> %				

PATHWAYS				
Evidence of Water Contamination	0	10	0	30
Level of Water Contamination	0	15	0	45
Type of Contamination, Soil/Biota	0	5	0	15
Distance to Nearest Surface Water	3	4	12	12
Depth to Groundwater	3	7	21	21
Net Precipitation	2	6	12	18
Soil Permeability	3	6	18	18
Bedrock Permeability	3	4	12	12
Depth to Bedrock	0	4	0	12
Surface Erosion	1	4	4	12
Number of Assumed Values = <u>0</u> Out of 10			SUBTOTALS	<u>79</u> <u>195</u>
Percentage of Assumed Values = <u>0</u> %			SUBSCORE	<u>41</u>
Number of Missing Values = <u>0</u> Out of 10			(Factor Score Divided by Maximum Score and Multiplied by 100)	
Percentage of Missing Values = <u>0</u> %				

WASTE CHARACTERISTICS

Hazardous Rating: Judgemental rating from 30 to 100 points based on the following guidelines:

Points

30	Closed domestic-type landfill, old site, no known hazardous wastes
40	Closed domestic-type landfill, recent site, no known hazardous wastes
50	Suspected small quantities of hazardous wastes
60	Known small quantities of hazardous wastes
70	Suspected moderate quantities of hazardous wastes
80	Known moderate quantities of hazardous wastes
90	Suspected large quantities of hazardous wastes
100	Known large quantities of hazardous wastes

Reason for Assigned Hazardous Rating:

SUBSCORE

60

Landfill was used between 1968-1972 for general base refuse. Site is re-vegetated. Known small quantities of hazardous wastes.

RATING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
WASTE MANAGEMENT PRACTICES				
Record Accuracy and Ease of Access to Site	2	7	14	21
Hazardous Waste Quantity	1	7	7	21
Total Waste Quantity	1	4	4	12
Waste Incompatibility	1	3	3	9
Absence of Liners or Confining Beds	3	6	18	18
Use of Leachate Collection System	3	6	18	18
Use of Gas Collection Systems	3	2	6	6
Site Closure	2	8	16	24
Subsurface Flows	1	7	7	21
Number of Assumed Values = 2 Out of 9			93	150
Percentage of Assumed Values = 22 %				62
Number of Missing and Non-Applicable Values = 0 Out of 9				
Percentage of Missing and Non-Applicable Values = 0 %				
OVER: 1 Number of Assumed Values = 2 Out of 25				
Overall Percentage of Assumed Values = 8 %				

OVERALL SCORE

60

(Receptors Subscore X 0.22 plus
Pathways Subscore X 0.30 plus
Waste Characteristics Subscore X 0.24 plus
Waste Management Subscore X 0.24)

WASTE DISPOSAL SITE AND SPILL AREA
ASSESSMENT AND RATING FORM

Name of Site Landfill Number 5
 Location Located along South Road on Southeast side of runway
 Owner/Operator _____
 Comments _____

RATING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
RECEPTORS				
Population Within 1,000 Feet	0	4	0	12
Distance to Nearest Drinking Water Well	1	15	15	45
Distance to Conservation Boundary	3	6	18	18
Land Use/Zoning	2	3	6	9
Critical Environments	3	12	36	36
Water Quality of Nearby Surface Water Body	1	6	6	18
Number of Assumed Values = <u>0</u> Out of 6			SUBTOTALS	<u>81</u> <u>138</u>
Percentage of Assumed Values = <u>0</u> %			SUBSCORE	<u>59</u>
Number of Missing Values = <u>0</u> Out of 6			(Factor Score Divided by Maximum Score and Multiplied by 100)	
Percentage of Missing Values = <u>0</u> %				

PATHWAYS				
Evidence of Water Contamination	0	10	0	30
Level of Water Contamination	0	15	0	45
Type of Contamination, Soil/Biota	0	5	0	15
Distance to Nearest Surface Water	3	4	12	12
Depth to Groundwater	3	7	21	21
Net Precipitation	2	6	12	18
Soil Permeability	3	6	18	18
Bedrock Permeability	3	4	12	12
Depth to Bedrock	0	4	0	12
Surface Erosion	2	4	8	12
Number of Assumed Values = <u>0</u> Out of 10			SUBTOTALS	<u>83</u> <u>195</u>
Percentage of Assumed Values = <u>0</u> %			SUBSCORE	<u>43</u>
Number of Missing Values = <u>0</u> Out of 10			(Factor Score Divided by Maximum Score and Multiplied by 100)	
Percentage of Missing Values = <u>0</u> %				

WASTE CHARACTERISTICS

Hazardous Rating: Judgemental rating from 30 to 100 points based on the following guidelines:

Points

30	Closed domestic-type landfill, old site, no known hazardous wastes
40	Closed domestic-type landfill, recent site, no known hazardous wastes
50	Suspected small quantities of hazardous wastes
60	Known small quantities of hazardous wastes
70	Suspected moderate quantities of hazardous wastes
80	Known moderate quantities of hazardous wastes
90	Suspected large quantities of hazardous wastes
100	Known large quantities of hazardous wastes

SUBSCORE

50

Reason for Assigned Hazardous Rating:

This is the most recent landfill for base refuse. The landfill is partially vegetated.

Suspected small quantities of hazardous wastes.

RATING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
WASTE MANAGEMENT PRACTICES				
Record Accuracy and Ease of Access to Site *	2	7	14	21
Hazardous Waste Quantity	0	7	0	21
Total Waste Quantity	0	4	0	12
Waste Incompatibility *	1	3	3	9
Absence of Liners or Confining Beds	3	6	18	18
Use of Leachate Collection System	3	6	18	18
Use of Gas Collection Systems	3	2	6	6
Site Closure	2	8	16	24
Subsurface Flows	1	7	7	21
Number of Assumed Values = 2 Out of 9		SUBTOTALS	82	150
Percentage of Assumed Values = 22 %		SUBSCORE		55
Number of Missing and Non-Applicable Values = 0 Out of 9		(Factor Score Divided by Maximum Score and Multiplied by 100)		
Percentage of Missing and Non-Applicable Values = 0 %				

Overall Number of Assumed Values = 2 Out of 25

Overall Percentage of Assumed Values = 8 %

OVERALL SCORE

51

(Receptors Subscore X 0.22 plus
Pathways Subscore X 0.30 plus
Waste Characteristics Subscore X 0.24 plus
Waste Management Subscore X 0.24)

WASTE DISPOSAL SITE AND SPILL AREA
ASSESSMENT AND RATING FORM

Name of Site Burn Pits Number 1 and Number 2
Location West of East-West Runway
Owner/Operator _____
Comments _____

RATING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
RECEPTORS				
Population Within 1,000 Feet	0	4	0	12
Distance to Nearest Drinking Water Well	3	15	45	45
Distance to Reservation Boundary	2	6	12	18
Land Use/Zoning	2	3	6	9
Critical Environments	3	12	36	36
Water Quality of Nearby Surface Water Body	2	6	12	18
Number of Assumed Values = <u>0</u> Out of 6			SUBTOTALS	111
Percentage of Assumed Values = <u>0</u> %			SUBSCORE	138
Number of Missing Values = <u>0</u> Out of 6			(Factor Score Divided by Maximum Score and Multiplied by 100)	
Percentage of Missing Values = <u>0</u> %				

PATHWAYS				
Evidence of Water Contamination	0	10	0	30
Level of Water Contamination	0	15	0	45
Type of Contamination, Soil/Biota	0	5	0	15
Distance to Nearest Surface Water	3	4	12	12
Depth to Groundwater	3	7	21	21
Net Precipitation	2	6	12	18
Soil Permeability	2	6	12	18
Bedrock Permeability	3	4	12	12
Depth to Bedrock	0	4	0	12
Surface Erosion	0	4	0	12
Number of Assumed Values = <u>0</u> Out of 10			SUBTOTALS	69
Percentage of Assumed Values = <u>0</u> %			SUBSCORE	195
Number of Missing Values = <u>0</u> Out of 10			(Factor Score Divided by Maximum Score and Multiplied by 100)	
Percentage of Missing Values = <u>0</u> %				

WASTE CHARACTERISTICS

Hazardous Rating: Judgemental rating from 30 to 100 points based on the following guidelines:

Points

30	Closed domestic-type landfill, old site, no known hazardous wastes
40	Closed domestic-type landfill, recent site, no known hazardous wastes
50	Suspected small quantities of hazardous wastes
60	Known small quantities of hazardous wastes
70	Suspected moderate quantities of hazardous wastes
80	Known moderate quantities of hazardous wastes
90	Suspected large quantities of hazardous wastes
100	Known large quantities of hazardous wastes

	SUBSCORE	100
Reason for Assigned Hazardous Rating:		
Waste fuels were burned in this area; no evidence of any contamination.		
Large amounts of fire retardant chemicals used. Fuels & chemicals washed through sand into ground water.		

RATING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
WASTE MANAGEMENT PRACTICES				
Record Accuracy and Ease of Access to Site	2	7	14	21
Hazardous Waste Quantity	3	7	21	21
Total Waste Quantity	0	4	0	12
Waste Incompatibility	0	3	0	9
Absence of Liners or Confining Beds	3	6	18	18
Use of Leachate Collection System **	-	6	-	-
Use of Gas Collection Systems **	-	2	-	-
Site Closure	3	8	24	24
Subsurface Flows	0	7	0	21
Number of Assumed Values = 0 Out of 9		SUBTOTALS	77	126
Percentage of Assumed Values = 0 %		SUBSCORE		61
Number of Missing and Non-Applicable Values = 2 Out of 9		(Factor Score Divided by Maximum Score and Multiplied by 100)		
Percentage of Missing and Non-Applicable Values = 22 %				
Overall Number of Assumed Values = 0 Out of 25				
Overall Percentage of Assumed Values = 0 %		OVERALL SCORE		68

(Receptors Subscore X 0.22 plus
Pathways Subscore X 0.30 plus
Waste Characteristics Subscore X 0.24 plus
Waste Management Subscore X 0.24)

WASTE DISPOSAL SITE AND SPILL AREA
ASSESSMENT AND RATING FORM

Name of Site Burn Pit Number 3
Location Located near Sewage Treatment Plant
Owner/Operator _____
Comments _____

RATING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
RECEPTORS				
Population Within 1,000 Feet	1	4	4	12
Distance to Nearest Drinking Water Well	3	15	45	45
Distance to Reservation Boundary	3	6	18	18
Land Use/Zoning	2	3	6	9
Critical Environments	3	12	36	36
Water Quality of Nearby Surface Water Body	1	6	6	18
Number of Assumed Values = <u>0</u> Out of 6			SUBTOTALS	115
Percentage of Assumed Values = <u>0</u> %			SUBSCORE	83
Number of Missing Values = <u>0</u> Out of 6			(Factor Score Divided by Maximum Score and Multiplied by 100)	
Percentage of Missing Values = <u>0</u> %				

PATHWAYS				
Evidence of Water Contamination	0	10	0	30
Level of Water Contamination	0	15	0	45
Type of Contamination, Soil/Biota	0	5	0	15
Distance to Nearest Surface Water	1	4	4	12
Depth to Groundwater	3	7	21	21
Net Precipitation	2	6	12	18
Soil Permeability	2	6	12	18
Bedrock Permeability	3	4	12	12
Depth to Bedrock	0	4	0	12
Surface Erosion	0	4	0	12
Number of Assumed Values = <u>0</u> Out of 10			SUBTOTALS	61
Percentage of Assumed Values = <u>0</u> %			SUBSCORE	31
Number of Missing Values = <u>0</u> Out of 10			(Factor Score Divided by Maximum Score and Multiplied by 100)	
Percentage of Missing Values = <u>0</u> %				

WASTE CHARACTERISTICS

Hazardous Rating: Judgemental rating from 30 to 100 points based on the following guidelines:

Points

30	Closed domestic-type landfill, old site, no known hazardous wastes
40	Closed domestic-type landfill, recent site, no known hazardous wastes
50	Suspected small quantities of hazardous wastes
60	Known small quantities of hazardous wastes
70	Suspected moderate quantities of hazardous wastes
80	Known moderate quantities of hazardous wastes
90	Suspected large quantities of hazardous wastes
100	Known large quantities of hazardous wastes

	SUBSCORE	100
Reason for Assigned Hazardous Rating:		
Waste fuels were burned in this area for fire training between 1965 and 1969. No evidence of contamination exists and the area is grown over with dense vegetation.		

RATING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
WASTE MANAGEMENT PRACTICES				
Record Accuracy and Ease of Access to Site	2	7	14	21
Hazardous Waste Quantity	2	7	14	21
Total Waste Quantity	0	4	0	12
Waste Incompatibility	0	3	0	9
Absence of Liners or Confining Beds	3	6	18	18
Use of Leach Collection System	**	6	-	-
Use of Gas Collection Systems	**	2	-	-
Site Closure	3	8	24	24
Subsurface Flows	0	7	0	21
Number of Assumed Values = 0 Out of 9			SUBTOTALS	70 126
Percentage of Assumed Values = 0 %			SUBSCORE	56
Number of Missing and Non-Applicable Values = 2 Out of 9			(Factor Score Divided by Maximum Score and Multiplied by 100)	
Percentage of Missing and Non-Applicable Values = 22 %				

Overall Number of Assumed Values = 0 Out of 25
Overall Percentage of Assumed Values = 0 %

OVERALL SCORE 64
(Receptors Subscore X 0.22 plus
Pathways Subscore X 0.30 plus
Waste Characteristics Subscore X 0.24 plus
Waste Management Subscore X 0.24)

WASTE DISPOSAL SITE AND SPILL AREA
ASSESSMENT AND RATING FORM

Name of Site Burn Pit Number 4
Location Located in the old revetment area east of runway
Owner/Operator _____
Comments _____

RATING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
RECEPTORS				
Population Within 500 Feet	0	4	0	12
Distance to Nearest Drinking Water Well	1	15	15	45
Distance to Reservation Boundary	2	6	12	18
Land Use/Zoning	2	3	6	9
Critical Environments	0	12	0	36
Water Quality of Nearby Surface Water Body	1	6	6	18
Number of Assumed Values = <u>0</u> Out of 6			SUBTOTALS	39
Percentage of Assumed Values = <u>0</u> %			SUBSCORE	28
Number of Missing Values = <u>0</u> Out of 6			(Factor Score Divided by Maximum Score and Multiplied by 100)	
Percentage of Missing Values = <u>0</u> %				

PATHWAYS				
Evidence of Water Contamination	0	10	0	30
Level of Water Contamination	0	15	0	45
Type of Contamination, Soil Biota	0	5	0	15
Distance to Nearest Surface Water	1	4	4	12
Depth to Groundwater	3	7	21	21
Net Precipitation	2	6	12	18
Soil Permeability	2	6	12	18
Bedrock Permeability	3	4	12	12
Depth to Bedrock	0	4	0	12
Surface Erosion	0	4	0	12
Number of Assumed Values = <u>0</u> Out of 10			SUBTOTALS	61
Percentage of Assumed Values = <u>0</u> %			SUBSCORE	31
Number of Missing Values = <u>0</u> Out of 10			(Factor Score Divided by Maximum Score and Multiplied by 100)	
Percentage of Missing Values = <u>0</u> %				

WASTE CHARACTERISTICS

Hazardous Rating: Judgemental rating from 30 to 100 points based on the following guidelines:

Points

30	Closed domestic-type landfill, old site, no known hazardous wastes
40	Closed domestic-type landfill, recent site, no known hazardous wastes
50	Suspected small quantities of hazardous wastes
60	Known small quantities of hazardous wastes
70	Suspected moderate quantities of hazardous wastes
80	Known moderate quantities of hazardous wastes
90	Suspected large quantities of hazardous wastes
100	Known large quantities of hazardous wastes

SUBSCORE 30

Reason for Assigned Hazardous Rating:

This area has been used as a fire training area - area flooded with water and then JP4 spread on water surface - little ground water contamination

RATING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
WASTE MANAGEMENT PRACTICES				
Record Accuracy and Ease of Access to Site	2	7	14	21
Hazardous Waste Quantity	0	7	0	21
Total Waste Quantity	0	4	0	12
Waste Incompatibility	0	3	0	9
Absence of Liners or Confining Beds	3	6	18	18
Use of Leachate Collection System **	-	6	-	-
Use of Gas Collection Systems **	-	2	-	-
Site Closure	3	8	24	24
Subsurface Flows	0	7	0	21
Number of Assumed Values = <u>0</u> Out of 9	SUBTOTALS		56	126
Percentage of Assumed Values = <u>0</u> %	SUBSCORE			45
Number of Missing and Non-Applicable Values = <u>2</u> Out of 9	(Factor Score Divided by Maximum Score and Multiplied by 100)			
Percentage of Missing and Non-Applicable Values = <u>22</u> %				

Overall Number of Assumed Values = 0 Out of 25

Overall Percentage of Assumed Values = 0 %

OVERALL SCORE 33

(Receptors Subscore X 0.22 plus
Pathways Subscore X 0.30 plus
Waste Characteristics Subscore X 0.24 plus
Waste Management Subscore X 0.24)

WASTE DISPOSAL SITE AND SPILL AREA
ASSESSMENT AND RATING FORM

Name of Site Weathering Pit Number 1
Location Behind POL Waste Oil and Contaminated Fuel Storage Area
Owner/Operator _____
Comments _____

RATING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
RECEPTORS				
Population Within 1,000 Feet	2	4	8	12
Distance to Nearest Drinking Water Well	3	15	45	45
Distance to Reservation Boundary	2	6	12	18
Land Use Zoning	2	3	6	9
Critical Environments	3	12	36	36
Water Quality of Nearby Surface Water Body	2	6	12	18
Number of Assumed Values = <u>0</u> Out of 6			SUBTOTALS	<u>119</u> <u>138</u>
Percentage of Assumed Values = <u>0</u> %			SUBSCORE	<u>86</u>
Number of Missing Values = <u>0</u> Out of 6			(Factor Score Divided by Maximum Score and Multiplied by 100)	
Percentage of Missing Values = <u>0</u> %				

PATHWAYS				
Evidence of Water Contamination	0	10	0	30
Level of Water Contamination	0	15	0	45
Type of Contamination, Soil, Biota	2	5	10	15
Distance to Nearest Surface Water	3	4	12	12
Depth to Groundwater	3	7	21	21
Net Precipitation	2	6	12	18
Soil Permeability	3	6	18	18
Bedrock Permeability	3	4	12	12
Depth to Bedrock	0	4	0	12
Surface Erosion	0	4	0	12
Number of Assumed Values = <u>0</u> Out of 10			SUBTOTALS	<u>85</u> <u>195</u>
Percentage of Assumed Values = <u>0</u> %			SUBSCORE	<u>44</u>
Number of Missing Values = <u>0</u> Out of 10			(Factor Score Divided by Maximum Score and Multiplied by 100)	
Percentage of Missing Values = <u>0</u> %				

WASTE CHARACTERISTICS

Hazardous Rating: Judgemental rating from 30 to 100 points based on the following guidelines:

Points

30	Closed domestic-type landfill, old site, no known hazardous wastes
40	Closed domestic-type landfill, recent site, no known hazardous wastes
50	Suspected small quantities of hazardous wastes
60	Known small quantities of hazardous wastes
70	Suspected moderate quantities of hazardous wastes
80	Known moderate quantities of hazardous wastes
90	Suspected large quantities of hazardous wastes
100	Known large quantities of hazardous wastes

SUBSCORE

100

Reason for Assigned Hazardous Rating:

Weathering Pit was used between 1973 and 1978. Oils and oily materials were known to have been disposed in the pit.

RATING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
WASTE MANAGEMENT PRACTICES				
Record Accuracy and Ease of Access to Site	2	7	14	21
Hazardous Waste Quantity	1	7	7	21
Total Waste Quantity	0	4	0	12
Waste Incompatibility	0	3	0	9
Absence of Liners or Containing Beds	3	6	18	18
Use of Leachate Collection System	**	6	-	-
Use of Gas Collection Systems	**	2	-	-
Site Closure	2	8	16	24
Subsurface Flows	1	7	7	21
Number of Assumed Values = 0 Out of 9			SUBTOTALS	62
Percentage of Assumed Values = 0 %			SUBSCORE	49
Number of Missing and Non-Applicable Values = 2 Out of 9			(Factor Score Divided by Maximum Score and Multiplied by 100)	
Percentage of Missing and Non-Applicable Values = 22 %				
Overall Number of Assumed Values = 0 Out of 25				
Overall Percentage of Assumed Values = 0 %			OVERALL SCORE	68
			(Receptors Subscore X 0.22 plus Pathways Subscore X 0.30 plus Waste Characteristics Subscore X 0.24 plus Waste Management Subscore X 0.24)	

WASTE DISPOSAL SITE AND SPILL AREA
ASSESSMENT AND RATING FORM

Name of Site Weathering Pit Number 2
 Location On top of Landfill #3
 Owner/Operator _____
 Comments _____

RATING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
RECEPTORS				
Population within 1,000 Feet	1	4	4	12
Distance to Nearest Drinking Water Well	3	15	45	45
Distance to Reservation Boundary	3	6	18	18
Land Use/Zoning	2	3	6	9
Critical Environments	3	12	36	36
Water Quality of Nearby Surface Water Body	2	6	12	18
Number of Assumed Values = <u>0</u> Out of 6			SUBTOTALS	121
Percentage of Assumed Values = <u>0</u> %			SUBSCORE	88
Number of Missing Values = <u>0</u> Out of 6			(Factor Score Divided by Maximum Score and Multiplied by 100)	
Percentage of Missing Values = <u>0</u> %				

PATHWAYS				
Evidence of Water Contamination	2	10	20	30
Level of Water Contamination	3	15	45	45
Type of Contamination, Soil/Biota	3	5	15	15
Distance to Nearest Surface Water	3	4	12	12
Depth to Groundwater	3	7	21	21
Net Precipitation	2	6	12	18
Soil Permeability	2	6	12	18
Bedrock Permeability	3	4	12	12
Depth to Bedrock	0	4	0	12
Surface Erosion	2	4	8	12
Number of Assumed Values = <u>0</u> Out of 10			SUBTOTALS	157
Percentage of Assumed Values = <u>0</u> %			SUBSCORE	81
Number of Missing Values = <u>0</u> Out of 10			(Factor Score Divided by Maximum Score and Multiplied by 100)	
Percentage of Missing Values = <u>0</u> %				

WASTE CHARACTERISTICS

Hazardous Rating: Judgemental rating from 30 to 100 points based on the following guidelines:

Points

30	Closed domestic-type landfill, old site, no known hazardous wastes
40	Closed domestic-type landfill, recent site, no known hazardous wastes
50	Suspected small quantities of hazardous wastes
60	Known small quantities of hazardous wastes
70	Suspected moderate quantities of hazardous wastes
80	Known moderate quantities of hazardous wastes
90	Suspected large quantities of hazardous wastes
100	Known large quantities of hazardous wastes

SUBSCORE 100

Reason for Assigned Hazardous Rating:

Two diked areas containing oily wastes. Evidence is apparent but oil wastes have overflowed
the basin dikes constructed adjacent to drainage ditch, on top of old landfill.

RATING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
WASTE MANAGEMENT PRACTICES				
Record Accuracy and Ease of Access to Site	2	7	14	21
Hazardous Waste Quantity	2	7	14	21
Total Waste Quantity	1	4	4	12
Waste Incompatibility	0	3	0	9
Absence of Liners or Confining Beds	3	6	18	18
Leachate Collection System	-	6	-	-
Use of Gas Collection Systems	-	2	-	-
Site Closure	3	8	24	24
Subsurface Flows	0	7	0	21
Number of Assumed Values = <u>0</u> Out of 9	SUBTOTALS		<u>74</u>	<u>126</u>
Percentage of Assumed Values = <u>0</u> %	SUBSCORE			<u>59</u>
Number of Missing and Non-Applicable Values = <u>2</u> Out of 9	(Factor Score Divided by Maximum Score and Multiplied by 100)			
Percentage of Missing and Non-Applicable Values = <u>22</u> %				

Overall Number of Assumed Values = 0 Out of 25

Overall Percentage of Assumed Values = 0 %

OVERALL SCORE 92

(Receptors Subscore X 0.22 plus
 Pathways Subscore X 0.30 plus
 Waste Characteristics Subscore X 0.24 plus
 Waste Management Subscore X 0.24)

WASTE DISPOSAL SITE AND SPILL AREA
ASSESSMENT AND RATING FORM

Name of Site Myrtle Beach Pipeline Corp. Tank
Location West of POL Area
Owner/Operator _____
Comments _____

RATING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
RECEPTORS				
Population Within 1,000 Feet	1	4	4	12
Distance to Nearest Drinking Water Well	3	15	45	45
Distance to Reservation Boundary	1	6	6	18
Land Use/Zoning	2	3	6	9
Critical Environments	3	12	36	36
Water Quality of Nearby Surface Water Body	2	6	12	18
Number of Assumed Values = <u>0</u> Out of 6			SUBTOTALS	<u>109</u> <u>138</u>
Percentage of Assumed Values = <u>0</u> %			SUBSCORE	<u>79</u>
Number of Missing Values = <u>0</u> Out of 6			(Factor Score Divided by Maximum Score and Multiplied by 100)	
Percentage of Missing Values = <u>0</u> %				

PATHWAYS				
Evidence of Water Contamination	3	10	30	30
Amount of Water Contamination	3	15	45	45
Type of Contamination, Soil/Biota	3	5	15	15
Distance to Nearest Surface Water	3	4	12	12
Depth to Groundwater	2	7	21	21
Net Precipitation	2	6	12	18
Soil Permeability	3	6	18	18
Bedrock Permeability	3	4	12	12
Depth to Bedrock	0	4	0	12
Surface Erosion	0	4	0	12
Number of Assumed Values = <u>0</u> Out of 10			SUBTOTALS	<u>165</u> <u>195</u>
Percentage of Assumed Values = <u>0</u> %			SUBSCORE	<u>85</u>
Number of Missing Values = <u>0</u> Out of 10			(Factor Score Divided by Maximum Score and Multiplied by 100)	
Percentage of Missing Values = <u>0</u> %				

WASTE CHARACTERISTICS

Hazardous Rating: Judgemental rating from 30 to 100 points based on the following guidelines:

Points

30	Closed domestic-type landfill, old site, no known hazardous wastes
40	Closed domestic-type landfill, recent site, no known hazardous wastes
50	Suspected small quantities of hazardous wastes
60	Known small quantities of hazardous wastes
70	Suspected moderate quantities of hazardous wastes
80	Known moderate quantities of hazardous wastes
90	Suspected large quantities of hazardous wastes
100	Known large quantities of hazardous wastes

SUBSCORE 100

Reason for Assigned Hazardous Rating:

Spill of 124,000 gallons of JP4 occurred 15 Jan. '81 - To date approximately 20,000 gallons recovered in a french drain

RATING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
WASTE MANAGEMENT PRACTICES				
Record Accuracy and Ease of Access to Site	1	7	7	21
Hazardous Waste Quantity	3	7	21	21
Total Waste Quantity	0	4	0	12
Waste Incompatibility	0	3	0	9
Absence of Liners or Confining Beds	2	6	12	18
Use of Leachate Collection System	1	6	6	18
Use of Gas Collection Systems **	-	2	-	-
Site Closure **	-	9	-	-
Subsurface Flows **	-	7	-	-
Number of Assumed Values = <u>0</u> Out of 9	SUBTOTALS		<u>46</u>	<u>99</u>
Percentage of Assumed Values = <u>0</u> %	SUBSCORE			<u>46</u>
Number of Missing and Non-Applicable Values = <u>3</u> Out of 9	(Factor Score Divided by Maximum Score and Multiplied by 100)			
Percentage of Missing and Non-Applicable Values = <u>33</u> %				

Overall Number of Assumed Values = 0 Out of 25

Overall Percentage of Assumed Values = 0 %

OVERALL SCORE 78

(Receptors Subscore X 0.22 plus
Pathways Subscore X 0.30 plus
Waste Characteristics Subscore X 0.24 plus
Waste Management Subscore X 0.24)

WASTE DISPOSAL SITE AND SPILL AREA
ASSESSMENT AND RATING FORM

Name of Site Flightline Contaminated Area
Location _____
Owner/Operator _____
Comments _____

RATING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
RECEPTORS				
Population Within 1,000 Feet	3	4	12	12
Distance to Nearest Drinking Water Well	3	15	45	45
Distance to Reservation Boundary	1	6	6	18
Land Use/Zoning	2	3	6	9
Critical Environments	3	12	36	36
Water Quality of Nearby Surface Water Body	2	6	12	18
Number of Assumed Values = <u>0</u> Out of 6			SUBTOTALS	<u>117</u> <u>138</u>
Percentage of Assumed Values = <u>0</u> %			SUBSCORE	<u>85</u>
Number of Missing Values = <u>0</u> Out of 6			(Factor Score Divided by Maximum Score and Multiplied by 100)	
Percentage of Missing Values = <u>0</u> %				

PATHWAYS				
Evidence of Water Contamination	3	10	30	30
Level of Water Contamination	3	15	45	45
Type of Contamination, Soil/Biota	1	5	5	15
Distance to Nearest Surface Water	2	4	8	12
Depth to Groundwater	3	7	21	21
Net Precipitation	2	6	12	18
Soil Permeability	3	6	18	18
Bedrock Permeability	3	4	12	12
Depth to Bedrock	0	4	0	12
Surface Erosion	0	4	0	12
Number of Assumed Values = <u>0</u> Out of 10			SUBTOTALS	<u>151</u> <u>195</u>
Percentage of Assumed Values = <u>0</u> %			SUBSCORE	<u>77</u>
Number of Missing Values = <u>0</u> Out of 10			(Factor Score Divided by Maximum Score and Multiplied by 100)	
Percentage of Missing Values = <u>0</u> %				

WASTE CHARACTERISTICS

Hazardous Rating: Judgemental rating from 30 to 100 points based on the following guidelines:

Points

30	Closed domestic-type landfill, old site, no known hazardous wastes
40	Closed domestic-type landfill, recent site, no known hazardous wastes
50	Suspected small quantities of hazardous wastes
60	Known small quantities of hazardous wastes
70	Suspected moderate quantities of hazardous wastes
80	Known moderate quantities of hazardous wastes
90	Suspected large quantities of hazardous wastes
100	Known large quantities of hazardous wastes

SUBSCORE 80

Reason for Assigned Hazardous Rating:

Pump test conducted by State resulted in pumping petroleum product from ground water

RATING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
WASTE MANAGEMENT PRACTICES				
Record Accuracy and Ease of Access to Site	2	7	14	21
Hazardous Waste Quantity	0	7	0	21
Total Waste Quantity	0	4	0	12
Waste Incompatibility	0	3	0	9
Absence of Liners or Confining Beds	3	6	18	18
Use of Leachate Collection System	3	6	18	18
Use of Gas Collection Systems	**	-	-	-
Site Closure	**	-	-	-
Subsurface Flows	**	-	-	-
Number of Assumed Values = <u>0</u> Out of 9	SUBTOTALS		<u>50</u>	<u>99</u>
Percentage of Assumed Values = <u>0</u> %	SUBSCORE			<u>51</u>
Number of Missing and Non-Applicable Values = <u>3</u> Out of 9	(Factor Score Divided by Maximum Score and Multiplied by 100)			
Percentage of Missing and Non-Applicable Values = <u>33</u> %				

Overall Number of Assumed Values = 0 Out of 25

Overall Percentage of Assumed Values = 0 %

OVERALL SCORE 73

(Receptors Subscore X 0.22 plus
Pathways Subscore X 0.30 plus
Waste Characteristics Subscore X 0.24 plus
Waste Management Subscore X 0.24)

WASTE DISPOSAL SITE AND SPILL AREA
ASSESSMENT AND RATING FORM

Name of Site POL Bulk Fuel Storage Area (Tank 41103 and area east of Tank)
 Location North of Avenue "D"
 Owner/Operator _____
 Comments _____

RATING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
RECEPTORS				
Population Within 1,000 Feet	2	4	8	12
Distance to Nearest Drinking Water Well	3	15	45	45
Distance to Observation Boundary	2	6	12	18
Land Use/Zoning	2	3	6	9
Critical Environments	3	12	36	36
Water Quality of Nearby Surface Water Body	2	6	12	18
Number of Assumed Values = <u>0</u> Out of 6	SUBTOTALS		<u>119</u>	<u>138</u>
Percentage of Assumed Values = <u>0</u> %	SUBSCORE		<u>87</u>	
Number of Missing Values = <u>0</u> Out of 6	(Factor Score Divided by Maximum Score and Multiplied by 100)			
Percentage of Missing Values = <u>0</u> %				

PATHWAYS				
Evidence of Water Contamination	1	10	10	30
Level of Water Contamination	3	15	45	45
Type of Contamination, Soil/Biota	0	5	0	15
Distance to Nearest Surface Water	3	4	12	12
Depth to Groundwater	3	7	21	21
Net Precipitation	2	6	12	18
Soil Permeability	3	6	18	18
Bedrock Permeability	3	4	12	12
Depth to Bedrock	0	4	0	12
Surface Erosion	0	4	0	12
Number of Assumed Values = <u>0</u> Out of 10	SUBTOTALS		<u>130</u>	<u>195</u>
Percentage of Assumed Values = <u>0</u> %	SUBSCORE		<u>67</u>	
Number of Missing Values = <u>0</u> Out of 10	(Factor Score Divided by Maximum Score and Multiplied by 100)			
Percentage of Missing Values = <u>0</u> %				

WASTE CHARACTERISTICS

Hazardous Rating: Judgemental rating from 30 to 100 points based on the following guidelines:

Points

30	Closed domestic-type landfill, old site, no known hazardous wastes
40	Closed domestic-type landfill, recent site, no known hazardous wastes
50	Suspected small quantities of hazardous wastes
60	Known small quantities of hazardous wastes
70	Suspected moderate quantities of hazardous wastes
80	Known moderate quantities of hazardous wastes
90	Suspected large quantities of hazardous wastes
100	Known large quantities of hazardous wastes

SUBSCORE 70

Reason for Assigned Hazardous Rating:

Spills in area have been recorded and contamination was observed in 1963-1967 -- one spill 10,000 gallons -- lowered score because of spill age

RATING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
WASTE MANAGEMENT PRACTICES				
Record Accuracy and Ease of Access to Site	1	7	7	21
Hazardous Waste Quantity	3	7	21	21
Total Waste Quantity	0	4	0	12
Waste Incompatibility	0	3	0	9
Absence of Liners or Confining Beds	3	6	18	18
Use of Leachate Collection System	3	6	18	18
Use of Gas Collection Systems	-	2	-	-
Site Closure	3	8	24	24
Subsurface Flows	-	7	-	-
Number of Assumed Values = 0 Out of 9			SUBTOTALS	88 121
Percentage of Assumed Values = 0 %			SUBSCORE	72
Number of Missing and Non-Applicable Values = 2 Out of 9			(Factor Score Divided by Maximum Score and Multiplied by 100)	
Percentage of Missing and Non-Applicable Values = 22 %				
Overall Number of Assumed Values = 0 Out of 25				
Overall Percentage of Assumed Values = 0 %			OVERALL SCORE	73

(Receptors Subscore X 0.22 plus
Pathways Subscore X 0.30 plus
Waste Characteristics Subscore X 0.24 plus
Waste Management Subscore X 0.24)

WASTE DISPOSAL SITE AND SPILL AREA
ASSESSMENT AND RATING FORM

Name of Site Underground Waste Chemical Storage
Location Adjacent to Building 505
Owner/Operator _____
Comments _____

RATING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
RECEPTORS				
Population Within 1,000 Feet	2	4	8	12
Distance to Nearest Drinking Water Well	3	15	45	45
Distance to Reservation Boundary	2	6	12	18
Land Use/Zoning	2	3	6	9
Critical Environments	3	12	36	36
Water Quality of Nearby Surface Water Body	1	6	6	18
Number of Assumed Values = <u>0</u> Out of 6	SUBTOTALS		<u>113</u>	<u>138</u>
Percentage of Assumed Values = <u>0</u> %	SUBSCORE			<u>82</u>
Number of Missing Values = <u>0</u> Out of 6	(Factor Score Divided by Maximum Score and Multiplied by 100)			
Percentage of Missing Values = <u>0</u> %				

PATHWAYS				
Evidence of Water Contamination	0	10	0	30
Level of Water Contamination	0	15	0	45
Type of Contamination, Soil/Biota	2	5	10	15
Distance to Nearest Surface Water	1	4	4	12
Depth to Groundwater	3	7	21	21
Net Precipitation	2	6	12	18
Soil Permeability	2	6	12	18
Bedrock Permeability	3	4	12	12
Depth to Bedrock	0	4	0	12
Surface Erosion	0	4	0	12
Number of Assumed Values = <u>0</u> Out of 10	SUBTOTALS		<u>71</u>	<u>195</u>
Percentage of Assumed Values = <u>0</u> %	SUBSCORE			<u>36</u>
Number of Missing Values = <u>0</u> Out of 10	(Factor Score Divided by Maximum Score and Multiplied by 100)			
Percentage of Missing Values = <u>0</u> %				

WASTE CHARACTERISTICS

Hazardous Rating: Judgemental rating from 30 to 100 points based on the following guidelines:

Points

30	Closed domestic-type landfill, old site, no known hazardous wastes
40	Closed domestic-type landfill, recent site, no known hazardous wastes
50	Suspected small quantities of hazardous wastes
60	Known small quantities of hazardous wastes
70	Suspected moderate quantities of hazardous wastes
80	Known moderate quantities of hazardous wastes
90	Suspected large quantities of hazardous wastes
100	Known large quantities of hazardous wastes

SUBSCORE 50

Reason for Assigned Hazardous Rating:

Three underground chemical waste storage tanks are located in this area. One contains amounts of industrial solvent - PD680. The other two tanks are not being used - tank has overflowed through its surface vent.

RATING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
WASTE MANAGEMENT PRACTICES				
Record Accuracy and Ease of Access to Site	2	7	14	21
Hazardous Waste Quantity	0	7	0	21
Total Waste Quantity	0	4	0	12
Waste Incompatibility	0	3	0	9
Absence of Liners or Containing Beds	3	6	18	18
Use of Leachate Collection System	-	6	-	-
Use of Gas Collection Systems	-	2	-	-
Site Closure	-	8	-	-
Subsurface Flows	3	7	21	21
Number of Assumed Values = 2 Out of 9	SUBTOTALS		53	102
Percentage of Assumed Values = 22 %	SUBSCORE		52	
Number of Missing and Non-Applicable Values = 3 Out of 9	(Factor Score Divided by Maximum Score and Multiplied by 100)			
Percentage of Missing and Non-Applicable Values = 33 %				
Overall Number of Assumed Values = 2 Out of 25	OVERALL SCORE			
Overall Percentage of Assumed Values = 8 %	54			

(Receptors Subscore X 0.22 plus
Pathways Subscore X 0.30 plus
Waste Characteristics Subscore X 0.24 plus
Waste Management Subscore X 0.24)

WASTE DISPOSAL SITE AND SPILL AREA
ASSESSMENT AND RATING FORM

Name of Site Radioactive Vault
Location Near Transmitter Site
Owner/Operator _____
Comments _____

RATING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
RECEPTORS				
Population Within 1,000 Feet	2	4	8	12
Distance to Nearest Drinking Water Well	3	15	45	45
Distance to Reservation Boundary	3	6	18	18
Land Use/Zoning	2	3	6	9
Critical Environments	3	12	36	36
Quality of Nearby Surface Water Body	2	6	12	18
Number of Assumed Values = <u>0</u> Out of 6			SUBTOTALS	<u>125</u> <u>138</u>
Percentage of Assumed Values = <u>0</u> %			SUBSCORE	<u>91</u>
Number of Missing Values = <u>0</u> Out of 6			(Factor Score Divided by Maximum Score and Multiplied by 100)	
Percentage of Missing Values = <u>0</u> %				

PATHWAYS				
Evidence of Water Contamination	0	10	0	30
Level of Water Contamination	0	15	0	45
Type of Contamination, Soil, Biota	0	5	0	15
Distance to Nearest Surface Water	1	4	4	12
Depth to Groundwater	3	7	21	21
Net Precipitation	2	6	12	18
Soil Permeability	2	6	12	18
Bedrock Permeability	3	4	12	12
Depth to Bedrock	0	4	0	12
Surface Erosion	0	4	0	12
Number of Assumed Values = <u>0</u> Out of 10			SUBTOTALS	<u>61</u> <u>195</u>
Percentage of Assumed Values = <u>0</u> %			SUBSCORE	<u>31</u>
Number of Missing Values = <u>0</u> Out of 10			(Factor Score Divided by Maximum Score and Multiplied by 100)	
Percentage of Missing Values = <u>0</u> %				

WASTE CHARACTERISTICS

Hazardous Rating: Judgemental rating from 30 to 100 points based on the following guidelines:

Points

30	Closed domestic-type landfill, old site, no known hazardous wastes
40	Closed domestic-type landfill, recent site, no known hazardous wastes
50	Suspected small quantities of hazardous wastes
60	Known small quantities of hazardous wastes
70	Suspected moderate quantities of hazardous wastes
80	Known moderate quantities of hazardous wastes
90	Suspected large quantities of hazardous wastes
100	Known large quantities of hazardous wastes

SUBSCORE 10

Reason for Assigned Hazardous Rating:

Concrete Vault for radioactive material - when buried contents were unknown - area regraded -
not posted as radioactive

RATING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
WASTE MANAGEMENT PRACTICES				
Record Accuracy and Ease of Access to Site	2	7	14	21
Hazardous Waste Quantity	0	7	0	21
Total Waste Quantity	0	4	0	12
Waste Incompatibility	0	3	0	9
Absence of Liners or Confining Beds	0	6	0	18
Use of Leachate Collection System **	-	6	-	-
Use of Gas Collection Systems **	-	2	-	-
Site Closure	0	8	0	24
Subsurface Flows	1	7	7	21
Number of Assumed Values = <u>0</u> Out of 9		SUBTOTALS	<u>21</u>	<u>126</u>
Percentage of Assumed Values = <u>0</u> %		SUBSCORE		<u>17</u>
Number of Missing and Non-Applicable Values = <u>2</u> Out of 9		(Factor Score Divided by Maximum Score and Multiplied by 100)		
Percentage of Missing and Non-Applicable Values = <u>22</u> %				
Overall Number of Assumed Values = <u>0</u> Out of 25		OVERALL SCORE		<u>35</u>
Overall Percentage of Assumed Values = <u>0</u> %		(Receptors Subscore X 0.22 plus Pathways Subscore X 0.30 plus Waste Characteristics Subscore X 0.24 plus Waste Management Subscore X 0.24)		

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ENGINEERING-SCIENCE INC ATLANTA GA

F/G 13/2

INSTALLATION RESTORATION PROGRAM. PHASE I. RECORDS SEARCH; HAZA--ETC(U)

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APPENDIX J
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APPENDIX K

GLOSSARY

APPENDIX K

GLOSSARY

AF: Air Force

AFB: Air Force Base

AFR: Air Force Regulation

AFS: Air Force Station

AFSC: Air Force Systems Command

AG: Adjutant General

AGE: Aircraft Ground Equipment

ARTESIAN: Ground water contained under hydrostatic pressure

AQUICLUDE: Impermeable formation that impedes ground-water movement and does not yield water to a well or spring

AQUIFER: A geologic formation, group of formations, or part of a formation that is capable of yielding water to a well or spring

AVGAS: Aviation Gasoline

BIOACCUMULATE: Tendency of elements or compounds to accumulate or build up in the tissues of living organisms when they are exposed to these elements in their environments, e.g., heavy metals

CERL: Construction Engineering Research Laboratory

CLOSURE: The completion of a set of rigidly defined functions for a hazardous waste facility no longer in operation

COD: Chemical Oxygen Demand, a measure of the amount of oxygen required to oxidize organic and oxidizable inorganic compounds in water

CONFINED AQUIFER: An aquifer bounded above and below by impermeable beds or by beds of distinctly lower permeability than that of the aquifer itself

CONTAMINATION: The degradation of natural water quality to the extent that its usefulness is impaired; there is no implication of any specific limits since the degree of permissible contamination depends upon the intended end use or uses of the water

Det: Detachment

DHEC: South Carolina Department of Health and Environmental Control

DISPOSAL FACILITY: A facility or part of a facility at which hazardous waste is intentionally placed into or on land or water, and at which waste will remain after closure

DISPOSAL OF HAZARDOUS WASTE: The discharge, deposit, injection, dumping, spilling, or placing of any hazardous waste into or on land or water so that such waste or any constituent thereof may enter the environment or be emitted into the air or discharged into any waters, including ground water

DOD: Department of Defense

DOWNGRAIENT: In the direction of lower hydraulic head; the direction in which ground water flows

DPDO: Defense Property Disposal Office

DSA: Defense Supply Agency

DUMP: An uncovered land disposal site where solid and/or liquid wastes are deposited with little or no regard for pollution control or aesthetics; dumps are susceptible to open burning and are exposed to the elements, disease vectors and scavengers

EFFLUENT: A liquid waste discharge from a manufacturing or treatment process, in its natural state, or partially or completely treated, that discharges into the environment

EPA: Environmental Protection Agency

ES: Engineering-Science, Inc.

EROSION: The wearing away of land surface by wind or water

FACILITY: Any land and appurtenances thereon and thereto used for the treatment, storage and/or disposal of hazardous wastes

FCT: Fire Control Training

FLOOD PLAIN: The lowland and relatively flat areas adjoining inland and coastal areas of the mainland and off-shore islands, including, at a minimum, areas subject to a one percent or greater chance of flooding in any given year

FLOW PATH: The direction or movement of ground water and any contaminants that may be contained therein, as governed principally by the hydraulic gradient

GROUND WATER: Water beneath the land surface in the saturated zone that is under atmospheric or artesian pressure

GROUND WATER RESERVOIR: The earth materials and the intervening open spaces that contain ground water

HARDFILL: Disposal sites receiving construction debris, wood, miscellaneous spoil material

HAZARDOUS WASTE: A solid waste, or combination of solid wastes, which because of its quantity, concentration, or physical, chemical or infectious characteristics may cause or significantly contribute to an increase in mortality or an increase in serious, irreversible, or incapacitating reversible illness; or pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported, or disposed of, or otherwise managed

HAZARDOUS WASTE GENERATION: The act or process of producing a hazardous waste

HEAVY METALS: Metallic elements, including the transition series, which include many elements required for plant and animal nutrition in trace concentrations but which become toxic at higher concentrations

HQ: Headquarters

HWMF: Hazardous Waste Management Facility

INCOMPATIBLE WASTE: A waste unsuitable for commingling with another waste or material because the commingling might result in generation of extreme heat or pressure, explosion or violent reaction, fire, formation of substances which are shock sensitive, friction sensitive, or otherwise have the potential for reacting violently, formation of toxic dusts, mists, fumes, and gases, volatilization of ignitable or toxic chemicals due to heat generation in such a manner that the likelihood of contamination of ground water or escape of the substance into the environment is increased, any other reaction which might result in not meeting the Air, Human Health, and Environmental Standard

INFILTRATION: The flow of liquid through pores or small openings

ICW: Intra Coastal Waterway

IRP: Installation Restoration Program

LEACHATE: A solution resulting from the separation or dissolving of soluble or particulate constituents from solid waste or other man-placed medium by percolation of water

LEACHING: The process by which soluble materials in the soil, such as nutrients, pesticide chemicals or contaminants, are washed into a lower layer of soil or are dissolved and carried away by water

LINER: A continuous layer of natural or man-made materials beneath or on the sides of a surface impoundment, landfill, or landfill cell which restricts the downward or lateral escape of hazardous waste, hazardous waste constituents or leachate

LWDS: Liquid Waste Disposal System

MBAFB: Myrtle Beach Air Force Base

MBPC: Myrtle Beach Pipeline Company

MONITORING WELL: A well used to measure ground-water levels and to obtain samples

MSL: Mean Sea Level

ORGAINIC: Being, containing or relating to carbon compounds, especially in which hydrogen is attached to carbon

PCB: Polychlorinated Biphenyls are highly toxic to aquatic life; they persist in the environment for long period and are biologically accumulative

PERCOLOATION: Movement of moisture by gravity or hydrostatic pressure thorough interstices of unsaturated rock or soil

PD-680: Cleaning solvent

pH: Negative Logarithm of hydrogen ion concentration

PL: Public Law

POL: Petroleum, Oils and Lubricants

POLLUTANT: Any introduced gas, liquid or solid that makes a resource unfit for a specific purpose

PS-661: Cleaning Solvent

RCRA: Resource Conservation and Recovery Act

RECHARGE AREA: An area in which water is absorbed that eventually reaches the zone of saturation in one or more aquifers

RECHARGE: The addition of water to the ground-water system by natural or artificial processes .

SANITARY LANDFILL: A land disposal site using an engineered method of disposing solid wastes on land in a way that minimizes enviromental hazards

SATURATED ZONE: That part of the earth's crust in which all voids are filled with water

SLUDGE: The solid residue resulting from a manufacturing or wastewater treatment process which also produces a liquid stream

SOLID WASTE: Any garbage, refuse, or sludge from a waste treatment plant, water suply treatment, or air pollution control facility and other discarded material, including solid, liquid, semi-solid, or contained gaseous material resulting from industrial, commercial, mining, or agricultural operations and from community activities, but does not include solid or dissolved materials

in domestic sewage; solid or dissolved materials in irrigation return flows; industrial discharges which are point source subject to permits under Section 402 of the Federal Water Pollution Control Act, as amended (86 USC 880); or source, special nuclear, or by-product material as defined by the Atomic Energy Act of 1954 (68 USC 923)

SPILL: Any unplanned release or discharge of a hazardous waste onto or into the air, land, or water

STORAGE OF HAZARDOUS WASTE: Containment, either on a temporary basis or for a period of years, in such a manner as not to constitute disposal of such hazardous waste

TAC: Tactical Air Command

TOXICITY: The ability of a material to produce injury or disease upon exposure, ingestion, inhalation, or assimilation by a living organism

TRANSMISSIVITY: The rate at which water is transmitted through a unit width under a unit hydraulic gradient

TREATMENT OF HAZARDOUS WASTE: Any method, technique, or process including neutralization designed to change the physical, chemical, or biological character or composition of any hazardous waste so as to neutralize the waste or so as to render the waste nonhazardous

USAF: United States Air Force

USDA: United States Department of Agriculture

USGS: United States Geological Survey

WATER TABLE: Surface of a body of unconfined ground water at which the pressure is equal to that of the atmosphere



DEPARTMENT OF THE AIR FORCE

HEADQUARTERS TACTICAL AIR COMMAND
LANGLEY AIR FORCE BASE VA 23065

2 AUG 1982

DEEV

Installation Restoration Program (IRP) Records Search, Myrtle Beach AFB

See Distribution

1. We provided your office with copies of the subject report on or about 31 Oct 81. This study used a site rating model developed in Jun 1981 to identify the potential for contamination resulting from past disposal practices. On 26-27 Jan 82, representatives of USAF OEHL, AFESC, several major commands, Engineering Science, and CH2M Hill met at our office to develop an improved rating system. The new rating model, Hazardous Assessment Rating Methodology (HARM), is now used for all Air Force IRP studies. To maintain consistency, AFESC had their on-call contractors review their phase I studies performed before the advent of HARM and provide two additional appendices. The new appendices address the background of the HARM system and evaluate each of the phase I sites using the Jan 82 rating methodology.

2. Enclosed are copies of the added appendices for the Installation Restoration Program (IRP) Records Search at Myrtle Beach AFB. Request you attach these appendices to the phase I reports we provided you in Oct 81.

3. For AFRCE-ER: Request you distribute copies of the new appendices to the Regional Environmental Protection Agency and South Carolina Department of Health and Environmental Control.

4. For DTIC: Request you integrate the enclosed appendices with the Installation Restoration Program Records Search for Myrtle Beach AFB into the National Technical Information System (NTIS). The report and new appendices are approved for public release with unlimited distribution. ✓

5. Our project officer for IRP is Mr. Burnet, A/V 432-4430.

FOR THE COMMANDER


GEORGE C. WINDROW
Actg Dir of Eng & Env Plng

1 Atch
Appendices

82 08 12 052

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APPENDIX L

HAZARD ASSESSMENT RATING METHODOLOGY

MYRTLE BEACH AIR FORCE BASE

USAF INSTALLATION RESTORATION PROGRAM
HAZARD ASSESSMENT RATING METHODOLOGY

BACKGROUND

The Department of Defense (DOD) has established a comprehensive program to identify, evaluate, and control problems associated with past disposal practices at DOD facilities. One of the actions required under this program is to:

"develop and maintain a priority listing of contaminated installations and facilities for remedial action based on potential hazard to public health, welfare, and environmental impacts." (Reference: DEQPPM 81-5, 11 December 1981).

Accordingly, the United States Air Force (USAF) has sought to establish a system to set priorities for taking further actions at sites based upon information gathered during the Records Search phase of its Installation Restoration Program (IRP).

The first site rating model was developed in June 1981 at a meeting with representatives from USAF Occupational Environmental Health Laboratory (OEHL), Air Force Engineering Services Center (AFESC), Engineering-Science (ES) and CH₂M Hill. The basis for this model was a system developed for EPA by JRB Associates of McLean, Virginia. The JRB model was modified to meet Air Force needs.

After using this model for 6 months at over 20 Air Force installations, certain inadequacies became apparent. Therefore, on January 26 and 27, 1982, representatives of USAF OEHL, AFESC, various major commands, Engineering Science, and CH₂M Hill met to address the inadequacies. The result of the meeting was a new site rating model designed to present a better picture of the hazards posed by sites at Air Force installations. The new rating model described in this presentation is referred to as the Hazard Assessment Rating Methodology.

PURPOSE

The purpose of the site rating model is to provide a relative ranking of sites of suspected contamination from hazardous substances. This model will assist the Air Force in setting priorities for follow-on site investigations and confirmation work under Phase II of IRP.

This rating system is used only after it has been determined that (1) potential for contamination exists (hazardous wastes present in sufficient quantity), and (2) potential for migration exists. A site can be deleted from consideration for rating on either basis.

DESCRIPTION OF MODEL

Like the other hazardous waste site ranking models, the U.S. Air Force's site rating model uses a scoring system to rank sites for priority attention. However, in developing this model, the designers incorporated some special features to meet specific DOD program needs.

The model uses data readily obtained during the Record Search portion (Phase I) of the IRP. Scoring judgments and computations are easily made. In assessing the hazards at a given site, the model develops a score based on the most likely routes of contamination and the worst hazards at the site. Sites are given low scores only if there are clearly no hazards at the site. This approach meshes well with the policy for evaluating and setting restrictions on excess DOD properties.

As with the previous model, this model considers four aspects of the hazard posed by a specific site: the possible receptors of the contamination, the waste and its characteristics, potential pathways for waste contaminant migration, and any efforts to contain the contaminants. Each of these categories contains a number of rating factors that are used in the overall hazard rating.

The receptors category rating is calculated by scoring each factor, multiplying by a factor weighting constant and adding the weighted scores to obtain a total category score.

The pathways category rating is based on evidence of contaminant migration or an evaluation of the highest potential (worst case) for contaminant migration along one of three pathways. If evidence of contaminant migration exists, the category is given a subscore of 80 to 100 points. For indirect evidence, 80 points are assigned and for direct evidence 100 points are assigned. If no evidence is found, the highest score among three possible routes is used. These routes are surface water migration, flooding, and ground-water migration. Evaluation of each route involves factors associated with the particular migration route. The three pathways are evaluated and the highest score among all four of the potential scores is used.

The waste characteristics category is scored in three steps. First, a point rating is assigned based on an assessment of the waste quantity and the hazard (worst case) associated with the site. The level of confidence in the information is also factored into the assessment. Next, the score is multiplied by a waste persistence factor, which acts to reduce the score if the waste is not very persistent. Finally, the score is further modified by the physical state of the waste. Liquid wastes receive the maximum score, while scores for sludges and solids are reduced.

The scores for each of the three categories are then added together and normalized to a maximum possible score of 100. Then the waste management practice category is scored. Sites at which there is no containment are not reduced in score. Scores for sites with limited containment can be reduced by 5 percent. If a site is contained and well managed, its score can be reduced by 90 percent. The final site score is calculated by applying the waste management practices category factor to the sum of the scores for the other three categories.

FIGURE 1

HAZARD ASSESSMENT RATING METHODOLOGY FLOW CHART

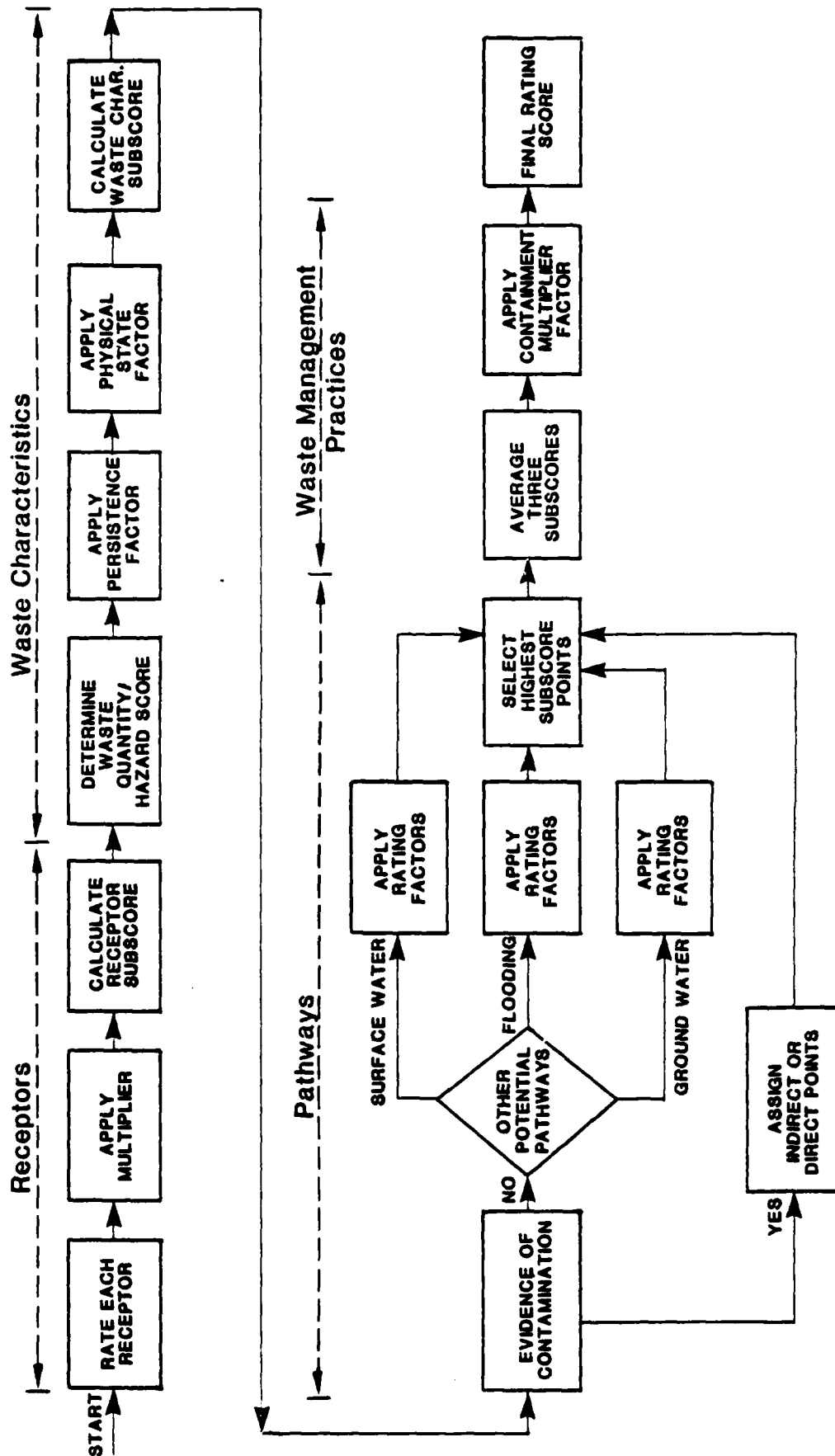


FIGURE 2
HAZARD ASSESSMENT RATING METHODOLOGY FORM

Page 1 of 2

NAME OF SITE _____
 LOCATION _____
 DATE OF OPERATION OR OCCURRENCE _____
 OWNER/OPERATOR _____
 COMMENTS/DESCRIPTION _____
 SITE RATED BY _____

I. RECEPTORS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A. Population within 1,000 feet of site		4		
B. Distance to nearest well		10		
C. Land use/zoning within 1 mile radius		3		
D. Distance to reservation boundary		6		
E. Critical environments within 1 mile radius of site		10		
F. Water quality of nearest surface water body		6		
G. Ground water use of uppermost aquifer		9		
H. Population served by surface water supply within 3 miles downstream of site		6		
I. Population served by ground-water supply within 3 miles of site		6		

Subtotals _____

Receptors subscore (100 X factor score subtotal/maximum score subtotal) _____

II. WASTE CHARACTERISTICS

A. Select the factor score based on the estimated quantity, the degree of hazard, and the confidence level of the information.

1. Waste quantity (S = small, M = medium, L = large) _____
2. Confidence level (C = confirmed, S = suspected) _____
3. Hazard rating (H = high, M = medium, L = low) _____

Factor Subscore A (from 20 to 100 based on factor score matrix) _____

B. Apply persistence factor

Factor Subscore A X Persistence Factor = Subscore B

_____ X _____ = _____

C. Apply physical state multiplier

Subscore B X Physical State Multiplier = Waste Characteristics Subscore

_____ X _____ = _____

FIGURE 2 (Continued)

Page 2 of 2

III. PATHWAYS

- A. If there is evidence of migration of hazardous contaminants, assign maximum factor subscore of 100 points for direct evidence or 80 points for indirect evidence. If direct evidence exists then proceed to C. If no evidence or indirect evidence exists, proceed to B.

Subscore _____

- B. Rate the migration potential for 3 potential pathways: surface water migration, flooding, and ground-water migration. Select the highest rating, and proceed to C.

1. Surface water migration

Distance to nearest surface water		8		
Net precipitation		6		
Surface erosion		8		
Surface permeability		6		
Rainfall intensity		8		

Subtotals _____

Subscore (100 x factor score subtotal/maximum score subtotal) _____

2. Flooding

Subscore (100 x factor score/3) _____

3. Ground-water migration

Depth to ground water		8		
Net precipitation		6		
Soil permeability		8		
Subsurface flows		8		
Direct access to ground water		8		

Subtotals _____

Subscore (100 x factor score subtotal/maximum score subtotal) _____

C. Highest pathway subscore.

Enter the highest subscore value from A, B-1, B-2 or B-3 above.

Pathways Subscore _____

IV. WASTE MANAGEMENT PRACTICES

- A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors _____
 Waste Characteristics _____
 Pathways _____

Total _____ divided by 3 = _____
 Gross Total Score

3. Apply factor for waste containment from waste management practices

Gross Total Score X Waste Management Practices Factor = Final Score

_____ X _____ =

TABLE 1
HAZARD ASSESSMENT RATING METHODOLOGY GUIDELINES

I. RECEPTORS CATEGORY	Rating Factors	Rating Scale Levels				Multiplier
		0	1	2	3	
A. Population within 1,000 feet (includes on-base facilities)		0	1 - 25	26 - 100	Greater than 100	4
B. Distance to nearest water well		Greater than 3 miles	1 to 3 miles	3,001 feet to 1 mile	0 to 3,000 feet	10
C. Land Use/zoning (within 1 mile radius)		Completely remote (zoning not applicable)	Agricultural	Commercial or industrial	Residential	6
D. Distance to installation boundary		Greater than 2 miles	1 to 2 miles	1,001 feet to 1 mile	0 to 1,000 feet	3
E. Critical environments (within 1 mile radius)		Not a critical environment	Natural areas	Pristine natural areas; minor wetlands; preserved areas; presence of economically important natural resources susceptible to contamination.	Major habitat of an endangered or threatened species; presence of recharge areas; major wetlands.	10
F. Water quality/use designation of nearest surface water body		Agricultural or industrial use.	Recreation, propagation and management of fish and wildlife.	Shellfish propagation and harvesting.	Potable water supplies	6
G. Ground-Water use of uppermost aquifer		Not used, other sources readily available.	Commercial, industrial, or irrigation, very limited other water sources.	Drinking water, municipal water available.	Drinking water, no municipal water available; commercial, industrial, or irrigation, no other water source available.	9
H. Population served by surface water supplies within 3 miles downstream of site		0	1 - 50	51 - 1,000	Greater than 1,000	6
I. Population served by aquifer supplies within 3 miles of site		0	1 - 50	51 - 1,000	Greater than 1,000	6

TABLE 1 (Continued)
HAZARD ASSESSMENT RATING METHODOLOGY GUIDELINES

II. WASTE CHARACTERISTICS

A-1 Hazardous Waste Quantity

- S = Small quantity (<5 tons or 20 drums of liquid)
- M = Moderate quantity (5 to 20 tons or 21 to 85 drums of liquid)
- L = Large quantity (>20 tons or 85 drums of liquid)

A-2 Confidence Level of Information

- C = Confirmed confidence level (minimum criteria below)
 - o Verbal reports from interviewer (at least 2) or written information from the records.
 - o Knowledge of types and quantities of wastes generated by shops and other areas on base.
 - o Based on the above, a determination of the types and quantities of waste disposed of at the site.
- S = Suspected confidence level
 - o No verbal reports or conflicting verbal reports and no written information from the records.
 - o Logic based on a knowledge of the types and quantities of hazardous wastes generated at the base, and a history of past waste disposal practices indicate that these wastes were disposed of at a site.

A-3 Hazard Rating

Hazard Category	Rating Scale Levels			
	0	1	2	3
Toxicity	Sax's Level 0	Sax's Level 1	Sax's Level 2	Sax's Level 3
Ignitability	Flash point greater than 200°F	Flash point at 140°F to 200°F	Flash point at 80°F to 140°F	Flash point less than 80°F
Radioactivity	At or below background levels	1 to 3 times back-ground levels	3 to 5 times back-ground levels	Over 5 times back-ground levels

Use the highest individual rating based on toxicity, ignitability and radioactivity and determine the hazard rating.

Hazard Rating	Points
High (H)	3
Medium (M)	2
Low (L)	1

TABLE 1 (Continued)
HAZARD ASSESSMENT RATING METHODOLOGY GUIDELINES

II. WASTE CHARACTERISTICS (Continued)

Waste Characteristics Matrix

Point Rating	Hazardous Waste Quantity	Confidence Level of Information	Hazard Rating
100	L	C	H
80	L	C	M
	M	C	H
70	L	S	H
60	S	C	H
	M	C	M
50	L	S	M
	L	C	L
	M	S	H
	S	C	M
40	S	S	H
	M	S	M
	M	C	L
	L	S	L
30	S	C	L
	M	S	L
	S	S	M
20	S	S	L

Notes:
For a site with more than one hazardous waste, the waste quantities may be added using the following rules:
Confidence Level
o Confirmed confidence levels (C) can be added
o Suspected confidence levels (S) can be added
o Confirmed confidence levels cannot be added with suspected confidence levels
Waste Hazard Rating
o Wastes with the same hazard rating can be added
o Wastes with different hazard ratings can only be added in a downgrade mode, e.g., MCH + SCH = LCH if the total quantity is greater than 20 tons.
Example: Several wastes may be present at a site, each having an MCH designation (60 points). By adding the quantities of each waste, the designation may change to LCH (80 points). In this case, the correct point rating for the waste is 80.

B. Persistence Multiplier for Point Rating

Persistence Criteria	Multiply Point Rating From Part A by the Following
Metals, polycyclic compounds, and halogenated hydrocarbons	1.0
Substituted and other ring compounds	0.9
Straight chain hydrocarbons	0.8
Easily biodegradable compounds	0.4

C. Physical State Multiplier

Physical State	Multiply Point Total From Parts A and B by the Following
Liquid	1.0
Sludge	0.75
Solid	0.50

TABLE 1 (Continued)
HAZARD ASSESSMENT RATING METHODOLOGY GUIDELINES

III. PATHWAYS CATEGORY

A. Evidence of Contamination

Direct evidence is obtained from laboratory analyses of hazardous contaminants present above natural background levels in surface water, ground water, or air. Evidence should confirm that the source of contamination is the site being evaluated.

Indirect evidence might be from visual observation (i.e., leachate), vegetation stress, sludge deposits, presence of taste and odors in drinking water, or reported discharges that cannot be directly confirmed as resulting from the site, but the site is greatly suspected of being a source of contamination.

B-1 POTENTIAL FOR SURFACE WATER CONTAMINATION

Rating Factor	Rating Scale Levels				Multiplier
	0	1	2	3	
Distance to nearest surface water (includes drainage ditches and storm sewers)	Greater than 1 mile	2,001 feet to 1 mile	501 feet to 2,000 feet	0 to 500 feet	8
Net precipitation	Less than -10 in.	-10 to +5 in.	+5 to +20 in.	Greater than +20 in.	6
Surface erosion	None	Slight	Moderate	Severe	8
Surface permeability	0% to 15% clay (>10 cm/sec)	15% to 30% clay (10 ⁻² to 10 ⁻⁶ cm/sec)	30% to 50% clay (10 ⁻² to 10 ⁻⁶ cm/sec)	Greater than 50% clay (<10 ⁻⁶ cm/sec)	6
Rainfall intensity based on 1 year 24-hr rainfall	<1.0 inch	1.0-2.0 inches	2.1-3.0 inches	>3.0 inches	8

B-2 POTENTIAL FOR FLOODING

Floodplain	Beyond 100-year floodplain	In 25-year floodplain	In 10-year floodplain	Floods annually	1
------------	----------------------------	-----------------------	-----------------------	-----------------	---

B-3 POTENTIAL FOR GROUND-WATER CONTAMINATION

Depth to ground water	Greater than 500 ft	50 to 500 feet	11 to 50 feet	0 to 10 feet	8
Net precipitation	Less than -10 in.	-10 to +5 in.	+5 to +20 in.	Greater than +20 in.	6
Soil permeability	Greater than 50% clay (>10 cm/sec)	30% to 50% clay (10 ⁻² to 10 ⁻⁶ cm/sec)	15% to 30% clay (10 ⁻² to 10 ⁻⁶ cm/sec)	0% to 15% clay (<10 ⁻² cm/sec)	8
Subsurface flows	Bottom of site greater than 5 feet above high ground-water level	Bottom of site occasionally submerged	Bottom of site frequently submerged	Bottom of site located below mean ground-water level	8
Direct access to ground water (through faults, fractures, faulty well casings, subsidence fissures, etc.)	No evidence of risk	Low risk	Moderate risk	High risk	8

TABLE 1 (Continued)
HAZARD ASSESSMENT RATING METHODOLOGY GUIDELINES

IV. WASTE MANAGEMENT PRACTICES CATEGORY

A. This category adjusts the total risk as determined from the receptors, pathways, and waste characteristics categories for waste management practices and engineering controls designed to reduce this risk. The total risk is determined by first averaging the receptors, pathways, and waste characteristics subscores.

B. WASTE MANAGEMENT PRACTICES FACTOR

The following multipliers are then applied to the total risk points (from A):

<u>Waste Management Practice</u>	<u>Multiplier</u>
No containment	1.0
Limited containment	0.95
Fully contained and in full compliance	0.10

Guidelines for fully contained:

Landfills:

- o Clay cap or other impermeable cover
- o Leachate collection system
- o Liners in good condition
- o Adequate monitoring wells

Surface Impoundments:

- o Liners in good condition
- o Sound dikes and adequate freeboard
- o Adequate monitoring wells

Spills:

- o Quick spill cleanup action taken
- o Contaminated soil removed
- o Soil and/or water samples confirm total cleanup of the spill

Fire Protection Training Areas:

- o Concrete surface and berms
- o Oil/water separator for pretreatment of runoff
- o Effluent from oil/water separator to treatment plant

General Note: If data are not available or known to be complete the factor ratings under items I-A through I, III-B-1 or III-B-3, then leave blank for calculation of factor score and maximum possible score.

APPENDIX M

HAZARD ASSESSMENT RATING METHODOLOGY SCORES

MYRTLE BEACH AIR FORCE BASE

HAZARD ASSESMENT RATING METHODOLOGY SCORES

MYRTLE BEACH AIR FORCE BASE

<u>Site</u>	<u>HARM Score</u>	<u>Rating Method</u>
1. Weathering Pit No. 2	92	M-1
2. Weathering Pit No. 1	73	M-
3. Myrtle Beach Pipeline Corp. Tank Spill	70	M-1
4. P.O. Bulk Fuel Storage Area (Tank 41103 & area east of tank)	76	M-
5. Landfill No. 3	74	M-1
6. Flightline Contaminated Area	71	M-11
7. Fire Training Areas No. 1 & No. 2	70	M-12
8. Fire Training Area No. 3	70	M-11
9. Landfill No. 4	67	M-17
10. Underground Waste Chemical Storage	61	M-19
11. Landfill No. 2	60	M-11
12. Landfill No. 1	58	M-20
13. Landfill No. 5	56	M-17
14. Fire Training Area No. 4	48	M-17
15. Radioactive Vault	5	M-19

**SUMMARY OF REVISED PHASE II RECOMMENDATIONS
MYRTLE BEACH AIR FORCE BASE**

August 1982

Site	Initial Score/ (1) Recommendation	Revised Score/ (2) Recommendation	Comments
Weathering Pit No. 2	92/Ground-Water Monitoring	92/Ground-Water Monitoring	No Change in Recommendation
Weathering Pit No. 1	66/Ground-Water Monitoring	78/Ground-Water Monitoring	No Change in Recommendation
Myrtle Beach Pipeline Co. Spill	78/Geophysical Survey	76/Geophysical Survey	No Change in Recommendation
POL Bulk Fuel Storage Area	73/Geophysical Survey	76/Geophysical Survey	No Change in Recommendation
Landfill No. 3	68/Ground-Water Monitoring	74/Ground-Water Monitoring	No Change in Recommendation
Flightline Contamination Area	73/Geophysical Survey	71/Geophysical Survey	No Change in Recommendation
Fire Training Areas Reg. 1 & 2	68/Ground-Water Monitoring	70/Ground-Water Monitoring	No Change in Recommendation
Fire Training Area No. 3	64/Ground-Water Monitoring	70/Ground-Water Monitoring	No Change in Recommendation
Landfill No. 4	60/Ground-Water Monitoring	61/Ground-Water Monitoring	No Change in Recommendation
All other Sites	None	None	No Change in Recommendation

- (1) Hazard Evaluation Methodology, June 1981
(2) Hazard Assessment Rating Methodology, January 1982

HAZARD ASSESSMENT RATING METHODOLOGY FORM

Page 1 of 1

NAME OF SITE Weathering Pit No. 2
 LOCATION On surface of southeast portion of Landfill No. 1
 DATE OF OPERATION OR OCCURRENCE 1979 to present
 OWNER/OPERATOR Myrtle Beach AFB
 COMMENTS/DESCRIPTION Leachate from the site observed
 SITE RATED BY C. M. Mangan

I. RECEPTORS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A. Population within 1,000 feet of site	1	4	4	4
B. Distance to nearest well	3	10	30	30
C. Land use/zoning within 1 mile radius	2	3	6	6
D. Distance to reservation boundary	3	6	18	18
E. Critical environments within 1 mile radius of site	3	10	30	30
F. Water quality of nearest surface water body	2	5	10	10
G. Ground water use of uppermost aquifer	2	9	18	18
H. Population served by surface water supply within 1 miles downstream of site	0	6	0	0
I. Population served by ground-water supply within 3 miles of site	3	6	18	18

Subtotals 100 100

Receptors subscore (100 X factor score subtotal/maximum score subtotal) 100

II. WASTE CHARACTERISTICS

A. Select the factor score based on the estimated quantity, the degree of hazard, and the confidence level of the information.

- Waste quantity (S = small, M = medium, L = large)
- Confidence level (C = confirmed, S = suspected)
- Hazard rating (H = high, M = medium, L = low)

Factor Subscore A (from 20 to 100 based on factor score matrix)

B. Apply persistence factor

Factor Subscore A X Persistence Factor = Subscore B

$$\underline{100} \times \underline{1.0} = \underline{100}$$

C. Apply physical state multiplier

Subscore B X Physical State Multiplier = Waste Characteristics Subscore

$$\underline{100} \times \underline{1.0} = \underline{100}$$

III. PATHWAYS

- | Rating Factor | Factor Rating (0-3) | Multiplier | Factor Score | Maximum Possible Score |
|--|---------------------|------------|--------------|------------------------|
| A. If there is evidence of migration of hazardous contaminants, assign maximum factor subscore of 100 points for direct evidence or 80 points for indirect evidence. If direct evidence exists then proceed to B. If indirect evidence exists, proceed to B. | | | | |

Subscore 100

- B. Rate the migration potential for 3 potential pathways: surface water migration, flooding, and ground-water migration. Select the highest rating, and proceed to C.

1. Surface water migration

Distance to nearest surface water	9
Net precipitation	6
Surface erosion	8
Surface permeability	6
Rainfall intensity	8

Subtotal Subscore (100 X factor score subtotal/maximum score subtotal)

2. Flooding

Subscore (100 x factor score/3)

3. Ground-water migration

Depth to ground water	8
Net precipitation	6
Soil permeability	3
Subsurface flows	9
Direct access to ground water	8

Subtotal Subscore (100 x factor score subtotal/maximum score subtotal)

C. Highest pathway subscore.

Enter the highest subscore value from A, B-1, B-2 or B-3 above.

Pathways Subscore

IV. WASTE MANAGEMENT PRACTICES

- A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors
Waste Characteristics
Pathways

Total 270 divided by 3 =Gross Total Score 90

- B. Apply factor for waste containment from waste management practices

Gross Total Score X Waste Management Practices Factor = Final Score

90 x =

HAZARD ASSESSMENT RATING METHODOLOGY FORM

Page 1 of 1

NAME OF SITE Weathering Pit No. 1
 LOCATION Behind POL Waste Oil and Contaminated Fuel Storage Area
 DATE OF OPERATION OR OCCURRENCE 1973 to 1978
 OWNER/OPERATOR Myrtle Beach AFB
 COMMENTS/DESCRIPTION 300 sq. ft. earthen site, 12" liquid depth, regraded
 SITE RATED BY CHM/MLA/SLA

I. RECEPTORS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A. Population within 1,000 feet of site	2	4	8	12
B. Distance to nearest well	3	10	30	30
C. Land use/zoning within 1 mile radius	2	3	6	6
D. Distance to reservation boundary	2	6	12	12
E. Critical environments within 1 mile radius of site	3	10	30	30
F. Water quality of nearest surface water body	2	6	12	12
G. Ground water use of uppermost aquifer	2	9	18	18
H. Population served by surface water supply within 1 mile downstream of site	0	6	0	12
I. Population served by ground-water supply within 1 mile of site	3	6	18	18

Subtotals 134 134

Receptors subscore (100 X factor score subtotal/maximum score subtotal)

II. WASTE CHARACTERISTICS

1. Select the factor score based on the estimated quantity, the degree of hazard, and the confidence level of the information.

1. Waste quantity (S = small, M = medium, L = large)

2. Confidence level (C = confirmed, S = suspected)

3. Hazard rating (H = high, M = medium, L = low)

Factor Subscore A (from 20 to 100 based on factor score matrix)

3. Apply persistence factor

Factor Subscore A X Persistence Factor = Subscore B

50 x 1.0 = 50

4. Apply physical state multiplier

Subscore B X Physical State Multiplier = Waste Characteristics Subscore

50 x 1.0 = 50

III. PATHWAYS

A. If there is evidence of migration of hazardous contaminants, assign maximum factor subscore of 100 points for direct evidence or 80 points for indirect evidence. If direct evidence exists then proceed to C. If no evidence or indirect evidence exists, proceed to B.

Subscore 100

B. Rate the migration potential for 3 potential pathways: surface water migration, flooding, and ground-water migration. Select the highest rating, and proceed to C.

1. Surface water migration

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
Distance to nearest surface water	3	8	24	24
Net precipitation	2	6	12	12
Surface erosion	0	8	0	24
Surface permeability	0	6	0	12
Rainfall intensity	3	8	24	24
Subtotals			60	100
Subscore (100 X factor score subtotal/maximum score subtotal)				50

2. Flooding

	0	1	0	
Subscore (100 x factor score/3)				0

3. Ground-water migration

Depth to ground water	3	3	24	24
Net precipitation	2	6	12	12
Soil permeability	3	3	24	24
Subsurface flows	1	3	6	24
Direct access to ground water	1	3	24	24
Subtotals			42	110
Subscore (100 x factor score subtotal/maximum score subtotal)				38

C. Highest pathway subscore.

Enter the highest subscore value from A, B-1, B-2 or B-3 above.

Pathways Subscore 50

IV. WASTE MANAGEMENT PRACTICES

A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors	50
Waste Characteristics	50
Pathways	50
Total <u>150</u>	divided by 3 = <u>50</u>
Gross Total Score	

B. Apply factor for waste containment from waste management practices

Gross Total Score X Waste Management Practices Factor = Final Score

78 x 1.0 = 78

HAZARD ASSESSMENT RATING METHODOLOGY FORM

Page 1 of 1

NAME OF SITE Myrtle Beach Pipeline Corp. Tank Spill
 LOCATION West of POL Area
 DATE OF OPERATION OR OCCURRENCE 1981
 OWNER/OPERATOR Myrtle Beach AFB
 COMMENTS/DESCRIPTION JP-4 Spill of 124,000 gallons, 20,000 gallons recovered
 SITE RATED BY C. M. Mangum

I. RECEPTORS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A. Population within 1,000 feet of site	1	4	4	12
B. Distance to nearest well	3	10	30	30
C. Land use/zoning within 1 mile radius	2	3	6	6
D. Distance to reservation boundary	1	6	6	12
E. Critical environments within 1 mile radius of site	3	10	30	30
F. Water quality of nearest surface water body	2	6	12	12
G. Ground water use of uppermost aquifer	2	9	18	18
H. Population served by surface water supply within 3 miles downstream of site	0	6	0	12
I. Population served by ground-water supply within 3 miles of site	3	6	18	18

Subtotals 124 124

Receptors subscore (100 X factor score subtotal/maximum score subtotal)

II. WASTE CHARACTERISTICS

A. Select the factor score based on the estimated quantity, the degree of hazard, and the confidence level of the information.

1. Waste quantity (S = small, M = medium, L = large)

2. Confidence level (C = confirmed, S = suspected)

3. Hazard rating (H = high, M = medium, L = low)

Factor Subscore A (from 20 to 100 based on factor score matrix)

B. Apply persistence factor

Factor Subscore A X Persistence Factor = Subscore B

100 x 8 = 80

C. Apply physical state multiplier

Subscore B X Physical State Multiplier = Waste Characteristics Subscore

80 x 1.0 = 80

III. PATHWAYS

- Factor Rating (0-3) Multiplier Factor Score
- A. If there is evidence of migration of hazardous contaminants, assign maximum factor subscore 100 for direct evidence or 80 points for indirect evidence. If direct evidence exists then proceed to B. If indirect evidence exists, proceed to B.

Subscore _____

- B. Rate the migration potential for 3 potential pathways: surface water migration, flooding, and ground-water migration. Select the highest rating, and proceed to C.

1. Surface water migration

Distance to nearest surface water	4		
Net precipitation	6		
Surface erosion	3		
Surface permeability	6		
Rainfall intensity	8		
Subtotals			

Subscore (100 x factor score subtotal/maximum score subtotal) _____

2. Flooding

Subscore (100 x factor score/3) _____

3. Ground-water migration

Depth to ground water	2	3	
Net precipitation	2	1	
Soil permeability	3		
Subsurface flows	9		
Direct access to ground water	5		
Subtotals			

Subscore (100 x factor score subtotal/maximum score subtotal) _____

C. Highest pathway subscore.

Enter the highest subscore value from A, B-1, B-2 or B-3 above.

Pathways Subscore _____

IV. WASTE MANAGEMENT PRACTICES

- A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors
Waste Characteristics
Pathways

Total _____ Divided by 3 = _____

- B. Apply factor for waste containment from waste management practices

Gross Total Score X Waste Management Practices Factor = Final Score

HAZARD ASSESSMENT RATING METHODOLOGY FORM

Page 1 of 2

NAME OF SITE POL Bulk Fuel Storage Area (Tank 41103 and area east of tank)
 LOCATION North of Avenue "D"
 DATE OF OPERATION OR OCCURRENCE 1963 to 1967
 OWNER/OPERATOR Myrtle Beach AFB
 COMMENTS/DESCRIPTION 10,000 gallon spill
 SITE RATED BY C. M. Mangan

I. RECEPTORS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A. Population within 1,000 feet of site	2	4	8	12
B. Distance to nearest well	3	10	30	30
C. Land use/zoning within 1 mile radius	2	3	6	6
D. Distance to reservation boundary	2	6	12	12
E. Critical environments within 1 mile radius of site	3	10	30	30
F. Water quality of nearest surface water body	2	6	12	12
G. Ground water use of uppermost aquifer	2	9	18	27
H. Population served by surface water supply within 3 miles downstream of site	0	6	0	6
I. Population served by ground-water supply within 3 miles of site	3	6	18	18

Subtotals 134 134

Receptors subscore (100 X factor score subtotal/maximum score subtotal) 72

II. WASTE CHARACTERISTICS

1. Select the factor score based on the estimated quantity, the degree of hazard, and the confidence level of the information.

1. Waste quantity (S = small, M = medium, L = large)

2. Confidence level (C = confirmed, S = suspected)

3. Hazard rating (H = high, M = medium, L = low)

Factor Subscore A (from 20 to 100 based on factor score matrix)

1. Apply persistence factor

Factor Subscore A X Persistence Factor = Subscore B

100 X 3 = 300

2. Apply physical state multiplier

Subscore B X Physical State Multiplier = Waste Characteristics Subscore

300 X 1.0 = 300

III. PATHWAYS

- A. If there is evidence of migration of hazardous contaminants, assign maximum factor subscore of 100 points for direct evidence or 80 points for indirect evidence. If direct evidence exists then proceed to C. If no evidence or indirect evidence exists, proceed to B.

Subscore NA

- B. Rate the migration potential for 3 potential pathways: surface water migration, flooding, and ground-water migration. Select the highest rating, and proceed to C.

1. Surface water migration

Distance to nearest surface water	3	8	24	
Net precipitation	2	6	12	
Surface erosion	0	8	0	
Surface permeability	0	6	0	
Rainfall intensity	3	8	24	
Subtotals			60	

Subscore (100 X factor score subtotal/maximum score subtotal)

2. Flooding

	0	1	0	
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Subscore (100 x factor score/3)

3. Ground-water migration

Depth to ground water	3	8	24	
Net precipitation	2	6	12	
Soil permeability	3	8	24	
Subsurface flows	0	8	0	
Direct access to ground water	0	8	0	
Subtotals			60	

Subscore (100 x factor score subtotal/maximum score subtotal)

4. Highest pathway subscore.

Enter the highest subscore value from A, B-1, B-2 or B-3 above.

Pathways Subscore 1

IV. WASTE MANAGEMENT PRACTICES

- A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors	<u>1</u>
Waste Characteristics	<u>1</u>
Pathways	<u>1</u>
Total	<u>3</u> divided by 3 =
	Gross Total: <u>1</u>

- B. Apply factor for waste containment from waste management practices

Gross Total Score X Waste Management Practices Factor = Final Score

M-6

HAZARD ASSESSMENT RATING METHODOLOGY FORM

Page 1 of 1

NAME OF SITE Landfill No. 3
 LOCATION Located adjacent to old State Route 207
 DATE OF OPERATION OR OCCURRENCE 1964 to 1968
 OWNER/OPERATOR Myrtle Beach AFB
 COMMENTS/DESCRIPTION Leachate from the site observed
 SITE RATED BY C. Mangan

I. RECEPTORS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A. Population within 1,000 feet of site	1	4	4	
B. Distance to nearest well	3	10	30	
C. Land use/zoning within 1 mile radius	2	3	6	
D. Distance to reservation boundary	3	6	18	
E. Critical environments within 1 mile radius of site	3	10	30	
F. Water quality of nearest surface water body	2	6	12	
G. Ground water use of uppermost aquifer	2	9	18	
H. Population served by surface water supply within 3 miles downstream of site	0	6	0	
I. Population served by ground-water supply within 3 miles of site	3	6	18	

Subtotals 138 138

Receptors subscore (100 X factor score subtotal/maximum score subtotal) 75

II. WASTE CHARACTERISTICS

A. Select the factor score based on the estimated quantity, the degree of hazard, and the confidence level of the information.

1. Waste quantity (S = small, M = medium, L = large)

2. Confidence level (C = confirmed, S = suspected)

3. Hazard rating (H = high, M = medium, L = low)

Factor Subscore A (from 20 to 100 based on factor score matrix)

B. Apply persistence factor

Factor Subscore A X Persistence Factor = Subscore B

50 x 0.9 = 45

C. Apply physical state multiplier

Subscore B X Physical State Multiplier = Waste Characteristics Subscore

45 x 1.0 = 45

III. PATHWAYS

- Rating Factor
- | Rating Factor | Factor Rating (0-3) | Multiplier | Factor Score | Maximum Possible |
|--|---------------------|------------|--------------|------------------|
| A. If there is evidence of migration of hazardous contaminants, assign maximum factor subscore of 100 points for direct evidence or 80 points for indirect evidence. If direct evidence exists then proceed to C. If indirect evidence exists, proceed to B. | | | | |

Subscore 100

- B. Rate the migration potential for 3 potential pathways: surface water migration, flooding, and ground-water migration. Select the highest rating, and proceed to C.

1. Surface water migration

Distance to nearest surface water	8	
Net precipitation	6	
Surface erosion	8	
Surface permeability	6	
Rainfall intensity	8	

Subtotals Subscore (100 X factor score subtotal/maximum score subtotal)

2. Flooding

Subscore (100 x factor score/3)

3. Ground-water migration

Depth to ground water	8	
Net precipitation	6	
Soil permeability	3	
Subsurface flows	3	
Direct access to ground water	8	

Subtotals Subscore (100 x factor score subtotal/maximum score subtotal)

C. Highest pathway subscore.

Enter the highest subscore value from A, B-1, B-2 or B-3 above.

Pathways Subscore 100

IV. WASTE MANAGEMENT PRACTICES

- A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors	<u> </u>
Waste Characteristics	<u> </u>
Pathways	<u> </u>
Total <u>220</u>	divided by 3 = <u>73.3</u>
Gross Total Score <u>73.3</u>	

3. Apply factor for waste containment from waste management practices

Gross Total Score X Waste Management Practices Factor = Final Score

73.3 X =

HAZARD ASSESSMENT RATING METHODOLOGY FORM

Page 1 of 2

NAME OF SITE Flightline Contaminated Area
 LOCATION _____
 DATE OF OPERATION OR OCCURRENCE Spill occurred in 1977
 OWNER/OPERATOR Myrtle Beach AFB
 COMMENTS/DESCRIPTION Petroleum product visually observed during pumping test
 SITE RATED BY C. Mangan

I. RECEPTORS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A. Population within 1,000 feet of site	3	4	12	
B. Distance to nearest well	3	10	30	
C. Land use/zoning within 1 mile radius	2	3	6	
D. Distance to reservation boundary	1	6	6	
E. Critical environments within 1 mile radius of site	2	10	20	
F. Water quality of nearest surface water body	2	6	12	
G. Ground water use of uppermost aquifer	2	9	18	
H. Population served by surface water supply within 3 miles downstream of site	0	6	0	
I. Population served by ground-water supply within 3 miles of site	3	6	18	

Subtotals 180 180

Receptors subscore = 100 X factor score subtotal / maximum score subtotal

II. WASTE CHARACTERISTICS

A. Select the factor score based on the estimated quantity, the degree of hazard, and the confidence level of the information.

1. Waste quantity (S = small, M = medium, L = large)

2. Confidence level (C = confirmed, S = suspected)

3. Hazard rating (H = high, M = medium, L = low)

Factor Subscore A (from 20 to 100 based on factor score matrix)

3. Apply persistence factor

Factor Subscore A X Persistence Factor = Subscore B

50 x .8 = 40

3. Apply physical state multiplier

Subscore B X Physical State Multiplier = Waste Characteristics Subscore

40 x 1.0 = 40

III. PATHWAYS

- A. If there is evidence of migration of hazardous contaminants, assign maximum factor subscore of 100 points for direct evidence or 80 points for indirect evidence. If direct evidence exists then proceed to C. If indirect evidence exists, proceed to B.

Subscore 100

- B. Rate the migration potential for 3 potential pathways: surface water migration, flooding, and ground-water migration. Select the highest rating, and proceed to C.

1. Surface water migration

Distance to nearest surface water	8	
Net precipitation	6	
Surface erosion	8	
Surface permeability	6	
Rainfall intensity	8	

Subtotals

Subscore (100 x factor score subtotal/maximum score subtotal)

2. Flooding

Subscore (100 x factor score/3)

3. Ground-water migration

Depth to ground water	8	
Net precipitation	6	
Soil permeability	8	
Subsurface flows	8	
Direct access to ground water	8	

Subtotals

Subscore (100 x factor score subtotal/maximum score subtotal)

C. Highest pathway subscore.

Enter the highest subscore value from A, B-1, B-2 or B-3 above.

Pathways Subscore

IV. WASTE MANAGEMENT PRACTICES

- A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors

Waste Characteristics

Pathways

Total 24 divided by 3 =

- B. Apply factor for waste containment to a waste management practices

Gross Total Score X Waste Management Practices Factor = Final Score

HAZARD ASSESSMENT RATING METHODOLOGY FORM

Page 1 of 2

NAME OF SITE Fire Training Area No. 1 & No. 2
 LOCATION West of East-West Runway
 DATE OF OPERATION OR OCCURRENCE 1965 to 1964
 OWNER/OPERATOR Myrtle Beach AFB
 COMMENTS/DESCRIPTION Waste fuels burned, no visual contamination
 SITE RATED BY C. M. ...

I. RECEPTORS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A. Population within 1,000 feet of site	2	4	8	12
B. Distance to nearest well	1	10	10	10
C. Land use/zoning within 1 mile radius	2	3	6	6
D. Distance to reservation boundary	2	6	12	12
E. Critical environments within 1 mile radius of site	3	10	30	30
F. Water quality of nearest surface water body	2	6	12	12
G. Ground water use of uppermost aquifer	2	9	18	18
H. Population served by surface water supply within 3 miles downstream of site	2	6	12	12
I. Population served by ground-water supply within 3 miles of site	2	6	12	12
Subtotals			126	

Receptors subscore (100 X factor score subtotal / maximum score subtotal)

II. WASTE CHARACTERISTICS

A. Select the factor score based on the estimated quantity, the degree of hazard, and the confidence level of the information.

1. Waste quantity (S = small, M = medium, L = large)

2. Confidence level (C = confirmed, S = suspected)

3. Hazard rating (H = high, M = medium, L = low)

Factor Subscore A (from 20 to 100 based on factor score matrix)

B. Apply persistence factor

Factor Subscore A X Persistence Factor = Subscore B

$$50 \times 1.2 = 60$$

C. Apply physical state multiplier

Subscore B X Physical State Multiplier = Waste Characteristics Subscore

$$60 \times 1.2 = 72$$

III. PATHWAYS

- A. If there is evidence of migration of hazardous contaminants, assign maximum factor subscore of 100 points for direct evidence or 80 points for indirect evidence. If direct evidence exists then proceed to C. If indirect evidence exists, proceed to B.

Subscore _____

- B. Rate the migration potential for 3 potential pathways: surface water migration, flooding, and ground-water migration. Select the highest rating, and proceed to C.

1. Surface water migration

Distance to nearest surface water	3	8	24
Net precipitation	2	6	12
Surface erosion	2	8	16
Surface permeability	1	6	6
Rainfall intensity	1	3	3

Subtotals _____

Subscore (100 x factor score subtotal/maximum score subtotal) _____

2. Flooding

0	1	0
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Subscore (100 x factor score/3) _____

3. Ground-water migration

Depth to ground water	3	3	9
Net precipitation	2	6	12
Soil permeability	2	3	6
Subsurface flows	0	4	0
Direct access to ground water	1	3	3

Subtotals _____

Subscore (100 x factor score subtotal/maximum score subtotal) _____

C. Highest pathway subscore.

Enter the highest subscore value from A, B-1, B-2 or B-3 above.

Pathways Subscore _____

IV. WASTE MANAGEMENT PRACTICES

- A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors
Waste Characteristics
Pathways

Total _____ divided by 3 =

- B. Apply factor for waste containment from waste management practices

Gross Total Score x Waste Management Practices Factor = Final Score

HAZARD ASSESSMENT RATING METHODOLOGY FORM

Page 1 of 1

NAME OF SITE Fire Training Area No. 3
 LOCATION Located near Sewage Treatment Plant
 DATE OF OPERATION OR OCCURRENCE 1965 to 1969
 OWNER/OPERATOR Military Beach AFB
 COMMENTS/DESCRIPTION Waste tank burned, no visual contamination
 SITE RATED BY [Signature]

I. RECEPTORS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A. Population within 1,000 feet of site		4		
B. Distance to nearest well		10		
C. Land use/zoning within 1 mile radius	2	3	6	
D. Distance to reservation boundary	3	6	18	
E. Critical environments within 1 mile radius of site	1	10		
F. Water quality of nearest surface water body	1	6	6	
G. Ground water use of uppermost aquifer	2	9	18	
H. Population served by surface water supply within 3 miles down stream of site		6		
I. Population served by ground-water supply within 3 miles of site		6	18	
Subtotals			138	

Receptors subscore 100 X factor score subtotal, maximum score subtotal

II. WASTE CHARACTERISTICS

1. Select the factor score based on the estimated quantity, the degree of hazard, and the confidence level of the information.

- 1. Waste quantity (S = small, M = medium, L = large)
- 2. Confidence level (C = confirmed, S = suspected)
- 3. Hazard rating (H = high, M = medium, L = low)

Factor Subscore A (from 20 to 100 based on factor score matrix)

3. Apply persistence factor

Factor Subscore A X Persistence Factor = Subscore B

10 X 10 = 100

4. Apply physical state multiplier

Subscore B X Physical State Multiplier = Waste Characteristics Subscore

10 X 10 = 100

III. PATHWAYS

- A. If there is evidence of migration of hazardous contaminants, assign maximum factor subscore of 100 points for direct evidence or 80 points for indirect evidence. If direct evidence exists then proceed to C. If no evidence or indirect evidence exists, proceed to B.

Subscore 100

- B. Rate the migration potential for 3 potential pathways: surface water migration, flooding, and ground-water migration. Select the highest rating, and proceed to C.

1. Surface water migration

Distance to nearest surface water	1	8	
Net precipitation	2	6	
Surface erosion		8	
Surface permeability		6	
Rainfall intensity		4	
		Subtotals	

Subscore (100 x factor score subtotal/maximum score subtotal) 100

2. Flooding

Subscore (100 x factor score/3) 33

3. Ground-water migration

Depth to ground water	3	3	24
Net precipitation	2	6	12
Soil permeability	2	6	12
Subsurface flows	2	8	16
Direct access to ground water		8	16
		Subtotals	80

Subscore (100 x factor score subtotal/maximum score subtotal) 80

C. Highest pathway subscore.

Enter the highest subscore value from A, B-1, B-2 or B-3 above.

Pathways Subscore 100

IV. WASTE MANAGEMENT PRACTICES

- A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors 100
 Waste Characteristics 100
 Pathways 100
 Total 300 divided by 3 =

Gross Total 100

- B. Apply factor for waste containment for waste management practices

Gross Total Score X Waste Management Practices Factor = Final Score

M-10

HAZARD ASSESSMENT RATING METHODOLOGY FORM

Page 1 of 2

NAME OF SITE Landfill No. 4
 LOCATION North of Golf Course and northeast of Detroit
 DATE OF OPERATION OR OCCURRENCE 1968-1972
 OWNER/OPERATOR Myrtle Beach AFB
 COMMENTS/DESCRIPTION 1 acre site, revegetated
 SITE RATED BY C. M. M. M. M.

I. RECEPTORS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A. Population within 1,000 feet of site	2	4	8	8
B. Distance to nearest well	1	10	10	10
C. Land use/zoning within 1 mile radius	2	3	6	6
D. Distance to reservation boundary	1	6	6	6
E. Critical environments within 1 mile radius of site	3	10	30	30
F. Water quality of nearest surface water body	1	6	6	6
G. Ground water use of uppermost aquifer	2	9	18	18
H. Population served by surface water supply within 3 miles downstream of site	0	6	0	6
I. Population served by ground-water supply within 3 miles of site	3	6	18	18
Subtotals			134	134

Receptors subscore (100 X factor score subtotal/maximum score subtotal)

II. WASTE CHARACTERISTICS

A. Select the factor score based on the estimated quantity, the degree of hazard, and the confidence level of the information.

1. Waste quantity (S = small, M = medium, L = large)

2. Confidence level (C = confirmed, S = suspected)

3. Hazard rating (H = high, M = medium, L = low)

Factor Subscore A (from 20 to 100 based on factor score matrix)

B. Apply persistence factor

Factor Subscore A X Persistence Factor = Subscore B

50 x .9 = 45

C. Apply physical state multiplier

Subscore B X Physical State Multiplier = Waste Characteristics Subscore

45 x 1.0 = 45

III. PATHWAYS

- A. If there is evidence of migration of hazardous contaminants, assign maximum factor subscore of 100 points for direct evidence or 80 points for indirect evidence. If direct evidence exists then proceed to C. If no evidence or indirect evidence exists, proceed to B.

Subscore 100

- B. Rate the migration potential for 3 potential pathways: surface water migration, flooding, and ground-water migration. Select the highest rating, and proceed to C.

1. Surface water migration

Distance to nearest surface water	3	8	24	100
Net precipitation	2	6	12	50
Surface erosion	1	8	8	33
Surface permeability	0	6	0	0
Rainfall intensity	3	8	24	100
Subtotals			68	283

Subscore (100 x factor score subtotal/maximum score subtotal) 100

2. Flooding

	0	1	0	0
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Subscore (100 x factor score/3) 0

3. Ground-water migration

Depth to ground water	3	8	24	100
Net precipitation	2	6	12	50
Soil permeability	3	8	24	100
Subsurface flows	1	8	8	33
Direct access to ground water	3	8	24	100
Subtotals			92	383

Subscore (100 x factor score subtotal/maximum score subtotal) 100

C. Highest pathway subscore.

Enter the highest subscore value from A, B-1, B-2 or B-3 above.

Pathways Subscore 100

IV. WASTE MANAGEMENT PRACTICES

- A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors 100
 Waste Characteristics 100
 Pathways 100

Total 300 divided by 3 =Gross Total Score 100

- B. Apply factor for waste containment from waste management practices

Gross Total Score X Waste Management Practices Factor = Final Score

100 x 1.0 =

HAZARD ASSESSMENT RATING METHODOLOGY FORM

Page 1 of 2

NAME OF SITE Underground Waste Chemical Storage
 LOCATION Adjacent to Building 505
 DATE OF OPERATION OR OCCURRENCE 1978 to present
 OWNER/OPERATOR Myrtle Beach AFB
 COMMENTS/DESCRIPTION 500 gallon underground steel tank storing waste PB-18
 SITE RATED BY C. M. Mangan

I. RECEPTORS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A. Population within 1,000 feet of site	2	4	8	8
B. Distance to nearest well	3	10	30	30
C. Land use/zoning within 1 mile radius	2	3	6	6
D. Distance to reservation boundary	2	6	12	12
E. Critical environments within 1 mile radius of site	3	10	30	30
F. Water quality of nearest surface water body	1	6	6	6
G. Ground water use of uppermost aquifer	2	9	18	18
H. Population served by surface water supply within 3 miles downstream of site	0	6	0	6
I. Population served by ground-water supply within 3 miles of site	3	6	18	18

Subtotals 144

Receptors subscore (100 X factor score subtotal/maximum score subtotal) 144

II. WASTE CHARACTERISTICS

A. Select the factor score based on the estimated quantity, the degree of hazard, and the confidence level of the information.

- Waste quantity (S = small, M = medium, L = large)
- Confidence level (C = confirmed, S = suspected)
- Hazard rating (H = high, M = medium, L = low)

Factor Subscore A (from 20 to 100 based on factor score matrix)

3. Apply persistence factor
 Factor Subscore A X Persistence Factor = Subscore B

$$\underline{144} \times \underline{1.0} = \underline{144}$$

4. Apply physical state multiplier

Subscore B X Physical State Multiplier = Waste Characteristics Subscore

$$\underline{144} \times \underline{1.0} = \underline{144}$$

III. PATHWAYS

- A. If there is evidence of migration of hazardous contaminants, assign maximum factor subscore of 100 points for direct evidence or 80 points for indirect evidence. If direct evidence exists then proceed to C. If indirect evidence exists, proceed to B.

Subscore 100

- B. Rate the migration potential for 3 potential pathways: surface water migration, flooding, and ground-water migration. Select the highest rating, and proceed to C.

1. Surface water migration

Distance to nearest surface water	2	8	16	100
Net precipitation	2	6	12	80
Surface erosion	0	8	0	0
Surface permeability	1	6	6	40
Rainfall intensity	3	8	24	160
Subtotals			50	380

Subscore (100 X factor score subtotal/maximum score subtotal) 40

2. Flooding

	0	1	0	0
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Subscore (100 x factor score/3) 0

3. Ground-water migration

Depth to ground water	3	8	24	160
Net precipitation	2	6	12	80
Soil permeability	2	8	16	120
Subsurface flows	3	8	24	160
Direct access to ground water		8	0	0
Subtotals			64	480

Subscore (100 x factor score subtotal/maximum score subtotal) 40

C. Highest pathway subscore.

Enter the highest subscore value from A, B-1, B-2 or B-3 above.

Pathways Subscore 40

IV. WASTE MANAGEMENT PRACTICES

- A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors 100
 Waste Characteristics 100
 Pathways 40

Total 240 divided by 3 =Gross Total 80

- B. Apply factor for waste containment from waste management practices

Gross Total Score X Waste Management Practices Factor = Final Score

80 x 0.15 = 12

4-20

HAZARD ASSESSMENT RATING METHODOLOGY FORM

Page 1 of 1

NAME OF SITE Landfill No. 2
 LOCATION South of Ordinance Road and north of POL bulk storage tank
 DATE OF OPERATION OR OCCURRENCE 1960-1964
 OWNER/OPERATOR Myrtle Beach AFB
 COMMENTS/DESCRIPTION 6 acre site, partially revegetated
 SITE RATED BY C. M. [signature]

I. RECEPTORS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A. Population within 1,000 feet of site	1	4	4	4
B. Distance to nearest well	3	10	30	30
C. Land use/zoning within 1 mile radius	2	3	6	6
D. Distance to reservation boundary	2	6	12	12
E. Critical environments within 1 mile radius of site	3	10	30	30
F. Water quality of nearest surface water body	2	6	12	12
G. Ground water use of uppermost aquifer	2	9	18	18
H. Population served by surface water supply within 3 miles downstream of site	0	6	0	6
I. Population served by ground-water supply within 3 miles of site	3	6	18	18

Subtotals 100 100

Receptors subscore (100 X factor score subtotal / maximum score subtotal)

II. WASTE CHARACTERISTICS

1. Select the factor score based on the estimated quantity, the degree of hazard, and the confidence level of the information.

1. Waste quantity (S = small, M = medium, L = large)

2. Confidence level (C = confirmed, S = suspected)

3. Hazard rating (H = high, M = medium, L = low)

Factor Subscore A (from 10 to 100 based on factor score matrix)

3. Apply persistence factor

Factor Subscore A X Persistence Factor = Subscore B

10 x .9 = 9

4. Apply physical state multiplier

Subscore B X Physical State Multiplier = Waste Characteristics Subscore

9 x 1.0 = 9

M-21

III. PATHWAYS

- Rating Factor Factor Rating (0-3) Multiplier Factor Score Maximum Possible Score
- A. If there is evidence of migration of hazardous contaminants, assign maximum factor subscore of 100 points for direct evidence or 80 points for indirect evidence. If direct evidence exists then proceed to B. If indirect evidence exists, proceed to B.

Subscore 100

- B. Rate the migration potential for 3 potential pathways: surface water migration, flooding, and ground-water migration. Select the highest rating, and proceed to C.

1. Surface water migration

Distance to nearest surface water	3	8	24
Net precipitation	2	6	12
Surface erosion	3	8	24
Surface permeability	2	6	12
Rainfall intensity	3	8	24
Subtotals			84

Subscore (100 X factor score subtotal/maximum score subtotal)

2. Flooding

0	1	0
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Subscore (100 x factor score/3)

3. Ground-water migration

Depth to ground water	3	8	24
Net precipitation	2	6	12
Soil permeability	3	8	24
Subsurface flows	1	8	8
Direct access to ground water	3	8	24
Subtotals			88

Subscore (100 x factor score subtotal/maximum score subtotal)

C. Highest pathway subscore.

Enter the highest subscore value from A, B-1, B-2 or B-3 above.

Pathways Subscore 100

IV. WASTE MANAGEMENT PRACTICES

- A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors 100
 Waste Characteristics 100
 Pathways 100
 Total 300 divided by 3 =

gross total score

- B. Apply factor for waste containment from waste management practices

Gross Total Score X Waste Management Practices Factor = Final Score

M-22

HAZARD ASSESSMENT RATING METHODOLOGY FORM

Page 1 of 1

NAME OF SITE Landfill No. 1
 LOCATION Western side of Aerovox Road
 DATE OF OPERATION OR OCCURRENCE 1955-1960
 OWNER OPERATOR Myrtle Beach AFB
 COMMENTS/DESCRIPTION 9 acre site, base golf course located over landfill
 SITE RATED BY Jim M. Morgan

I. RECEPTORS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A. Population within 1,000 feet of site	2	4	8	12
B. Distance to nearest well	3	10	30	30
C. Land use/zoning within 1 mile radius	3	3	9	9
D. Distance to reservation boundary	3	6	18	18
E. Critical environments within 1 mile radius of site	3	10	30	30
F. Water quality of nearest surface water body	1	6	6	6
G. Ground water use of uppermost aquifer	2	9	18	18
H. Population served by surface water supply within 3 miles downstream of site	0	6	0	6
I. Population served by ground-water supply within 3 miles of site	2	6	12	12
Subtotals				150

Receptors subscore (100 X factor score subtotal maximum score subtotal)

II. WASTE CHARACTERISTICS

A. Select the factor score based on the estimated quantity, the degree of hazard, and the confidence level of the information.

1. Waste quantity (S = small, M = medium, L = large)

2. Confidence level (C = confirmed, S = suspected)

3. Hazard rating (H = high, M = medium, L = low)

Factor Subscore A (from 20 to 100 based on factor score matrix)

B. Apply persistence factor

Factor Subscore A X Persistence Factor = Subscore B

 X =

C. Apply physical state multiplier

Subscore B X Physical State Multiplier = Waste Characteristics Subscore

 X =

III. PATHWAYS

- A. If there is evidence of migration of hazardous contaminants, assign maximum factor subscore of 100 points for direct evidence or 80 points for indirect evidence. If direct evidence exists then proceed to C. If no evidence or indirect evidence exists, proceed to B.

Subscore NA

- B. Rate the migration potential for 3 potential pathways: surface water migration, flooding, and ground-water migration. Select the highest rating, and proceed to C.

1. Surface water migration

Distance to nearest surface water	3	8	24	1
Net precipitation	2	6	12	1
Surface erosion	1	8	8	1
Surface permeability	0	6	0	1
Rainfall intensity	3	8	24	1

Subtotals 68 5

Subscore (100 X factor score subtotal/maximum score subtotal)

2. Flooding	0	1	0	1
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Subscore (100 x factor score/3)

3. Ground-water migration

Depth to ground water	3	8	24	1
Net precipitation	2	6	12	1
Soil permeability	3	8	24	1
Subsurface flows	1	8	8	1
Direct access to ground water	2	8	16	1

Subtotals 80 5

Subscore (100 x factor score subtotal/maximum score subtotal)

C. Highest pathway subscore.

Enter the highest subscore value from A, B-1, B-2 or B-3 above.

Pathways Subscore 68

IV. WASTE MANAGEMENT PRACTICES

- A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors
Waste Characteristics
Pathways

Total 124 divided by 3 =

Gross Total Score

- B. Apply factor for waste containment from waste management practices

Gross Total Score X Waste Management Practices Factor = Final Score

61 x 0.95

HAZARD ASSESSMENT RATING METHODOLOGY FORM

Page 1 of 2

NAME OF SITE Landfill No. 2
 LOCATION Located along South Road on southeast side of runway
 DATE OF OPERATION OR OCCURRENCE 1972-1974
 OWNER/OPERATOR Myrtle Beach AFB
 COMMENTS/DESCRIPTION 6 acre site, existing cover, no vegetation
 SITE RATED BY C. M. M. M. M.

I. RECEPTORS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A. Population within 1,000 feet of site	0	4	0	4
B. Distance to nearest well	1	10	10	10
C. Land use/zoning within 1 mile radius	2	3	6	6
D. Distance to reservation boundary	3	6	18	18
E. Critical environments within 1 mile radius of site	3	10	30	30
F. Water quality of nearest surface water body	1	6	6	6
G. Ground water use of uppermost aquifer	2	9	18	18
H. Population served by surface water supply within 3 miles downstream of site	0	6	0	6
I. Population served by ground-water supply within 3 miles of site	3	6	18	18
Subtotals			106	106

Receptors subscore (100 X factor score subtotal, maximum score subtotal.)

II. WASTE CHARACTERISTICS

A. Select the factor score based on the estimated quantity, the degree of hazard, and the confidence level of the information.

1. Waste quantity (S = small, M = medium, L = large)

2. Confidence level (C = confirmed, S = suspected)

3. Hazard rating (H = high, M = medium, L = low)

Factor Subscore A (from 20 to 100 based on factor score matrix)

3. Apply persistence factor

Factor Subscore A X Persistence Factor = Subscore B

30 X 3 = 90

4. Apply physical state multiplier

Subscore B X Physical State Multiplier = Waste Characteristics Subscore

90 X 1.0 = 90

III. PATHWAYS

- Rating Factor Factor Rating (0-3) Multiplier Factor Score Maximum Possible Score
- A. If there is evidence of migration of hazardous contaminants, assign maximum factor subscore of 100 points for direct evidence or 80 points for indirect evidence. If direct evidence exists then proceed to C. If indirect evidence or indirect evidence exists, proceed to B.

Subscore 100

- B. Rate the migration potential for 3 potential pathways: surface water migration, flooding, and ground-water migration. Select the highest rating, and proceed to C.

1. Surface water migration

Distance to nearest surface water	3	8	24
Net precipitation	2	6	12
Surface erosion	3	8	24
Surface permeability	2	6	12
Rainfall intensity	3	8	24
Subtotals			100

Subscore (100 X factor score subtotal/maximum score subtotal) 100

2. Flooding

Subscore (100 x factor score/3) 33

3. Ground-water migration

Depth to ground water	3	8	24
Net precipitation	2	6	12
Soil permeability	3	8	24
Subsurface flows	2	6	12
Direct access to ground water	3	8	24
Subtotals			100

Subscore (100 x factor score subtotal/maximum score subtotal) 100

C. Highest pathway subscore.

Enter the highest subscore value from A, B-1, B-2 or B-3 above.

Pathways Subscore 100

IV. WASTE MANAGEMENT PRACTICES

- A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors
Waste Characteristics
Pathways

Total 107 divided by 3 =

35.66666667

- B. Apply factor for waste containment from waste management practices

Gross Total Score X Waste Management Practices Factor = Final Score

35.66666667 X 1.0 =

HAZARD ASSESSMENT RATING METHODOLOGY FORM

Page 1 of 1

NAME OF SITE Fire Training Area No. 4
 LOCATION Located in the oil revetment area east of runway
 DATE OF OPERATION OR OCCURRENCE 1970 to present
 OWNER/OPERATOR Myrtle Beach AFB
 COMMENTS/DESCRIPTION JP-4 fuel burned
 SITE RATED BY C. M. Morgan

I. RECEPTORS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A. Population within 1,000 feet of site	0	4	0	4
B. Distance to nearest well	1	10	10	10
C. Land use/zoning within 1 mile radius	2	3	6	6
D. Distance to reservation boundary	2	6	12	12
E. Critical environments within 1 mile radius of site	0	10	0	10
F. Water quality of nearest surface water body	1	6	6	6
G. Ground water use of uppermost aquifer	2	9	18	18
H. Population served by surface water supply within 3 miles downstream of site	0	6	0	6
I. Population served by ground-water supply within 3 miles of site	3	6	18	18

Subtotals 72

Receptors subscore (100 X factor score subtotal/maximum score subtotal)

II. WASTE CHARACTERISTICS

A. Select the factor score based on the estimated quantity, the degree of hazard, and the confidence level of the information.

1. Waste quantity (S = small, M = medium, L = large)

2. Confidence level (C = confirmed, S = suspected)

3. Hazard rating (H = high, M = medium, L = low)

Factor Subscore A (from 20 to 100 based on factor score matrix)

B. Apply persistence factor

Factor Subscore A X Persistence Factor = Subscore B

$$72 \times .8 = 57.6$$

C. Apply physical state multiplier

Subscore B X Physical State Multiplier = Waste Characteristics Subscore

$$57.6 \times 1.0 = 57.6$$

III. PATHWAYS

- A. If there is evidence of migration of hazardous contaminants, assign maximum factor subscore of 10 points for direct evidence or 80 points for indirect evidence. If direct evidence exists then proceed to C. If indirect evidence exists, proceed to B.

Subscore 10

- B. Rate the migration potential for 3 potential pathways: surface water migration, flooding, and ground-water migration. Select the highest rating, and proceed to C.

1. Surface water migration

Distance to nearest surface water	1	8	8
Net precipitation	2	6	12
Surface erosion	0	8	0
Surface permeability	1	6	6
Rainfall intensity	3	3	24
Subtotals			50

Subscore (100 X factor score subtotal/maximum score subtotal) 10

2. Flooding

	0	1	0
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Subscore (100 x factor score/3) 0

3. Ground-water migration

Depth to ground water	3	3	24
Net precipitation	2	6	12
Soil permeability	2	8	16
Subsurface flows	0	3	0
Direct access to ground water	1	3	3
Subtotals			55

Subscore (100 x factor score subtotal/maximum score subtotal) 0

C. Highest pathway subscore.

Enter the highest subscore value from A, B-1, B-2 or B-3 above.

Pathways Subscore 10

IV. WASTE MANAGEMENT PRACTICES

- A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors	
Waste Characteristics	
Pathways	
Total	100

divided by 3 =

3. Apply factor for waste containment from waste management practices

Gross Total Score X Waste Management Practices Factor = Final Score

HAZARD ASSESSMENT RATING METHODOLOGY FORM

NAME OF SITE Radioactive Vault
 LOCATION Near transmitter site
 DATE OF OPERATION OR OCCURRENCE 1969
 OWNER/OPERATOR Myrtle Beach AF
 COMMENTS/DESCRIPTION Concrete vault, area reserved for future use
 SITE RATED BY C M Mangum

I. RECEPTORS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A. Population within 1,000 feet of site	2	4	8	12
B. Distance to nearest well	2	10	20	20
C. Land use/zoning within 1 mile radius	1	3	3	3
D. Distance to reservation boundary	1	6	6	6
E. Critical environments within 1 mile radius of site	2	10	20	20
F. Water quality of nearest surface water body	2	6	12	12
G. Ground water use of uppermost aquifer	2	9	18	18
H. Population served by surface water supply within 3 miles downstream of site	1	6	6	6
I. Population served by ground-water supply within 3 miles of site	1	6	6	6

Subtotals 100

Receptors subscore (100 X factor score subtotal/maximum score subtotal) 100

II. WASTE CHARACTERISTICS

A. Select the factor score based on the estimated quantity, the degree of hazard, and the confidence level of the information.

1. Waste quantity (S = small, M = medium, L = large) S

2. Confidence level (C = confirmed, S = suspected) C

3. Hazard rating (H = high, M = medium, L = low) H

Factor Subscore A (from 20 to 100 based on factor score matrix) 40

1. Apply persistence factor

Factor Subscore A X Persistence Factor = Subscore B

$$40 \times 1.0 = 40$$

2. Apply physical state multiplier

Subscore B X Physical State Multiplier = Waste Characteristics Subscore

$$40 \times 1.5 = 60$$

III. PATHWAYS

- A. If there is evidence of migration of hazardous contaminants, assign maximum factor subscore of 100 for direct evidence or 80 points for indirect evidence. If direct evidence exists then proceed to B. If indirect evidence exists, proceed to B.

Subscore _____

- B. Rate the migration potential for 3 potential pathways: surface water migration, flooding, and ground-water migration. Select the highest rating, and proceed to C.

1. Surface water migration

Distance to nearest surface water	2	8	
Net precipitation	2	6	
Surface erosion	2	8	
Surface permeability	2	6	
Rainfall intensity	3	8	24

Subtotals _____

Subscore (100 X factor score subtotal/maximum score subtotal) _____

2. Flooding

Subscore (100 x factor score/3) _____

3. Ground-water migration

Depth to ground water	3	9	24
Net precipitation	2	6	12
Soil permeability	2	9	18
Subsurface flows	1	8	8
Direct access to ground water	2	8	16

Subtotals _____

Subscore (100 x factor score subtotal/maximum score subtotal) _____

C. Highest pathway subscore.

Enter the highest subscore value from A, B-1, B-2 or B-3 above.

Pathways Subscore _____

IV. WASTE MANAGEMENT PRACTICES

- A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors _____

Waste Characteristics _____

Pathways _____

Total _____ divided by 3 = _____

Gross Total Score _____

- B. Apply factor for waste containment from waste management practices

Gross Total Score X Waste Management Practices Factor = Final Score

_____ X _____ = _____

E
ED

82